

# LAYING OF MDPE NETWORK AND GI/Cu INSTALLATION WORK FOR DOMESTIC, COMMERCIAL AND INDUSTRIAL CUSTOMERS FOR CUGL GA'S IN KANPUR, UNNAO, AND BAREILLY IN THE STATE OF UTTAR PRADESH

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**CENTRAL UP GAS LIMITED (CUGL)**  
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## 17.0 BACKFILLING

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

Prior to backfilling it should be ensured that the post padding of compacted thickness 150mm is put over and around the pipe immediately after lowering where required.

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

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

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

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




In case where hard rock is encountered or as desired by EIC / site engineer sand padding is to be provided upto height of 150 mm around the pipe.

When the trench has been dug through driveways or roads, all backfilling shall be executed with sand/suitable material in layers as approved by Owner /Owner's representative and shall be thoroughly compacted. Special compaction methods as specified may be adopted. All costs incurred there upon shall be borne by the Contractor.

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

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

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

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Electro-fusion of joints is to be undertaken immediately after lowering and the activity shall not be kept pending for lack of Electro-fusion jointing. The backfilling shall be considered complete only after the jointing of pipes.

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

## **18.0 TRENCHLESS LAYING (ONLY FOR 125 MM)**

Both Manual Moling and HDD are to be considered as methods of trenchless laying for 125 mm diameter pipeline only.

### **Manual Moling**

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

For Moling the contractor shall ensure that the size of the hole shall not be more than 20% of the size of the casing/carrier pipes whichever is applicable. After completion of Moling the hole shall be properly compacted / filled with soil by watering and by approved procedures.

The length of the Hole (excluding the sizes of the pits on both ends) shall be considered for the measurement of Moling length.

The usage of casing pipe will be decided by EIC at the time of final approval for crossing/laying.

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

### **HDD (Horizontal Directional Drilling)**

HDD is required to be carried out where conventional trenching/Moling is not possible viz. major waterways, highways, roads, congested areas etc. The Contractor shall obtain details of such crossings and the Contractor in consultation with Owner shall prepare construction drawings.




Execution of the work shall be based on the Owner / Owner's representative approved drawings. The contractor has to do the thorough survey of the underground utilities before commencement of HDD to avoid the damage to the other utilities. No other extra payment will be made for any trail/abandoned pits made during the survey. The supply of all equipment required for carrying out the HDD is in contractor's scope. The HDD operation shall be carried out in accordance with API-1102. The type and availability of machines is sole responsibility of the contractor and as per the site conditions & requirements to entire satisfaction of EIC.

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

The length of the Hole (excluding the sizes of the pits on both ends) shall be considered for the measurement of HDD length and is payable as per relevant SOR item no. The type of HDD to be carried out with or without casing shall be at the discretion of Owner and prior approval is to be taken from EIC before starting. The rates are inclusive of excavation of pits, jointing, pilot boring, bentonite cleaning, reaming, insertion of carrier pipe, backfilling, compaction, etc.

As per the specification, HDD to be carried out with or without casing pipe depends on the type of crossing. Any damages occurred to other utilities during the HDD operation shall be immediately notified and rectified by the contractor without any cost implication to OWNER.

HDD profiles should be properly marked/ recorded in graphs as per scale before it is drafted in the as built drawing.

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### **Casing Pipe**

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

S. No.	MDPE Carrier Pipe Dia. size (mm)	Min. Dia. of HDPE Casing Pipe (mm)	Max. Dia. of HDPE Casing Pipe (mm)
1	20		50
2	32	50	90
3	63	110	160
4	125	200	250

However, the size of the casing pipe may vary according to the length of the carrier pipe and requirement of laying of HDPE duct & OFC cable, if required. Also, the higher size of HDPE casing pipe shall be preferred over lower size casing pipe without any extra cost to the Owner.

## **19.0 RESTORATION**

Wherever the restoration to the original surface condition is in the scope of Owner or as directed by EIC, all roads, footpaths (including roads and footpaths inside colonies) shall be restored to its original condition and the same shall be done as per CPWD/IRC norms and to the satisfaction of the concerned local Authority/Third Party Agencies designated by Owner. To retard curing of the installed concrete, wet sackcloth is to be placed on the finished surface and kept damp for a period of 7 days.

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

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

The procedure for restoration of Road/Footpath, placed at Annexure # 2, is only indicative. However, the restoration shall be done in accordance with the norms of the concerned Land-owning agencies.

Turf shall be replaced in highly developed grassed area. In lesser-developed grassed areas topsoil should be replaced during the restoration process.




Where permanent surface restoration cannot be completed immediately, the Contractor shall provide and maintain a suitable temporary running surface for vehicular traffic and pedestrians. The Contractor will be responsible for the maintenance of all restoration carried out, for the duration of the Contract guarantee period.

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

The rate of restoration includes Asphalted / bituminous, concrete pavement, Agra stone/Kota stone / Tiles (Chequered / any other type of tiles), Marbles, interlocking paver blocks, Dry brick pavements etc. and is payable under one SOR.

Note that payment for restoration will be released only after satisfactory completion and certification by Third party/Consultant.

Contractor has to obtain the No Objection Certificate (NOC) from the concerned local authorities/RWA after completion of the restoration work. The restoration specification specified in the tender is only a typical specification and the contractor has to carry out restoration as per the latest version CPWD/IRC specification to its original condition and also to the entire satisfaction of landowner (Private/Public).

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

## **20.0 TESTING**

Pressure testing will be carried out with compressed air (free from oil and greases). Compressed air will be provided by Contractor for testing purposes and is to be included in the laying rates.

For both main & service pipeline laying, the Contractor shall perform progressive pressure testing to ensure no leaks in long lengths of pipe. The test pressure shall be 6.0 bar (g), and there shall be no unaccountable pressure loss during the test period.

Overall scheme drawing for pressure testing shall be prepared by the contractor and get approval from Owner/Owner representative.

For main line, the test duration shall be 24 hrs. with stabilization period of 30 minutes after pressurization. Then only the holding period may commence and continue for 24 hours. Measuring instruments shall have been calibrated and their accuracy and sensitivity confirmed before the start of testing, where in, calibrated pressure gauges of suitable range shall be supplied by the contractor. The pressure gauges shall be calibrated from time to time as desired by EIC.

All testing shall be witnessed and approved by the EIC or his delegated representative. Tie-in joints may be tested at working pressure following commissioning.

In special cases, where the mainline or service line length is less than 500 mtrs. holding period for testing may be reduced to 4 hrs with stabilisation period of 15 minutes.

For service lines, in some cases, testing shall be carried out independently than of mains for which the test duration may be reduced to 4 hrs. The service line testing in this case will be performed after the service line installation is complete but before the service line tee has been tapped for gas charging.

## **21.0 PURGING**

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

The Contractor shall also provide nitrogen required for purging as per the direction of Site In-charge. Nitrogen shall be supplied in labelled, tested and certified cylinders and completed with all necessary regulators, hoses and connections, which will be in good and working condition. No separate payment shall be paid for supplying Nitrogen cylinders for purging and is included in the laying rates.

In addition, the Contractor shall submit purging plan and get approval from Owner / Owner representative before commencing any purging work. The Plan shall include, but not be limited to the provision of the following materials and equipment: Personal Safety Equipment, Fire Extinguisher, Purging Adaptor, Purge stack with flame trap and gas sampling point, Gas sampling equipment (may be gas leak detector), squash-off tool, Polyethylene connecting pipe.

The Plan shall also include the purging process along with detail on the sequence of events. The process is to also specifically mention the need to lay a wet cloth over the PE main and in contact with the ground, to disperse static electricity during the purging work.

A purge stack with flame trap shall be used when purging services. Care shall be taken to ensure that the purge outlet is so located that vent gas cannot drift into buildings.




## **22.0 VALVE CHAMBERS**

Valve Chambers (RCC/Brick Wall) shall be constructed as per drawing. Prefabricated valve chambers with same dimensions are also allowed however the final designing and specifications shall be approved by EIC/PMC before start of production, without any extra cost to owner.

The construction of the valve chambers shall be taken up immediately after installation of valve, before commissioning of the pipeline network.

If required, it may also be instructed for construction of new valve chambers on existing gas charged pipeline before or after Gas charging for extensions or new pipeline network.



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The location for construction of valve chamber shall be proposed by contractor and approved by EIC/PMC before start extension / new MDPE network.

#### **Materials for Valve Pit**

RCC Pre-cast Slab shall conform to IS: 456. Heavy Duty RCC Manhole Cover shall be used. It shall be with raised with Lifting hooks. The RCC manhole cover shall have a clear opening as per the Construction Drawings issued to the contractor.




#### **Workmanship**

- The excavation work shall be done at a location given by Engineer-in-Charge. All care shall be taken not to damage existing facilities and surface of construction shall be restored to its original state. Sandbags to be placed below pipeline without disturbing the laid pipe. Gunny bags and Sand should be of approved quality.
- PCC to be placed below the pipe as indicated. Once PCC is set sand is to be filled and properly rammed so that pipe and pre-cast concrete blocks are firmly place.
- Valve will be supplied without the operating stem. Approved quality sand is to be placed in between area. The supply of sand is included in the rates.
- Surrounding area to be properly cleared and PCC to be placed around the location where pre-cast slab with RCC Manhole cover is placed. The RCC pre-cast slab to be laid in level and finished smooth.

### **23.0 PERMANENT MARKERS**

- 23.1 Permanent Markers (As per Drawings enclosed with the tender document) shall be Fabricated, supplied and installed on the ROU at regular intervals as per the instructions of the EIC immediately after laying of the Pipeline. The installation of the type of the Permanent Marker shall be decided by the EIC depending on the site condition. The contractor shall also ensure that a sample of all type of markers shall be inspected and approved by Owner / Owner representative before shipment of the lot at site and prior to installation at the site. The inspection of all types of markers shall be carried out lot wise.
- 23.2 The RCC Markers shall be painted before installation as per the approved procedure. Whereas the Pole marker (Markers with foundation) are to be supplied with powder coated Golden Yellow paint. The supply of the paint and application as per the specification is in contractor's scope. Contractor shall obtain the approval lot wise & before installation at site from the PMC / TPIA.
- 23.3 Guidelines for Marker installation:
- The installation of these markers shall be such that in between two Pole markers two RCC markers are installed with equal spacing of 50 mtrs. on either sides. However, Pole markers shall be installed at all the Tapping /Branching points in the mainline.
  - Interval between any two markers for mainline (for 20 mm up to 125 mm) shall not be more than 50m.
  - A Pole marker shall be installed next to valve chamber on Mainline & internal network for apartments/pockets respectively for indication.
  - Pole markers with foundations shall be installed after every two RCC route marker
  - Every entry and exit pits for laying of pipeline by HDD
  - Road crossings shall be marked by Pole markers or RCC markers depending upon the site conditions.
  - In addition to above, Pole markers with foundation (Enclosed in Tender) shall be installed outside of individual societies/areas as per the instructions of the Owner representative.
  - For the distribution network, 125, 63, 32 & 20mm OD pipe, plate markers shall be installed as per the site conditions and directions of the Site-in-Charge.
- 23.4 The artwork is typical for all the markers, with Owner's logo on it. The contractor must take prior approval for the artwork from EIC before installation of Markers. The lot wise approval shall be attached with bills.



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## **24.0 ASSISTANCE IN COMMISSIONING**

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

## **25.0 STANDARD OF WORK**




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

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

## **26.0 RECORDING (AS-BUILT DRAWINGS)**

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

- a) The as laid drawings should be in the scale of 1:200 and shall be submitted in an A-0 sheet. The drawings shall be in layers according the AUTOCAD features category.
- b) Pipeline feature shall be shown as a continuous line, breaks only at joints, fittings, valves, tee point, etc. Diameter, Pipe material, length, and location of pipeline whether on the road or footpath, should be clearly indicated.
- c) Distance of pipeline from permanent property/structure should be provided at least every 20 metres. If there is any change in alignment / orientation and offset distances etc. Of the pipeline in between the above said 20 mtr, the same shall be clearly mentioned in the as laids. Gas objects (off valves, tees, elbows, couplers, transition fittings etc.,) shall be shown as block objects (which form a single node to connect) with respect to Owner symbols / legend. The As laid drawings shall be as per the approved legends provided by EIC.
- d) Details & offset distances from other utilities present (e.g. BSES, DJB etc.) should be given in as laid drawing. If there is any change in depth of the pipeline, the same shall be clearly marked with details in the as laids drawings. The details (material, size &. Length) of additional protection provided to pipeline shall also be clearly indicated.
- e) Details of the PE stop off valves &. Other fittings used (i.e. tees, elbows, couplers, transition fittings, etc.) should be shown with adequate information orientation &. Offsets from permanent structures in the immediate vicinity.
- f) Technical deviations (if any) should be provided with reference to the building's permanent structures around, and the same should be cited clearly with all the relevant details, including separate sketches/Blowups / sectioned drawings / exploded view.
- g) Total as laid length (size wise), bill of materials should be mentioned in each sheet.
- h) Complete details of nallah crossings should be shown in a separate sketch.
- i) Names of roads, major landmarks and buildings should be mentioned appropriately for reference.
- j) Proper chainage shall be mentioned on all the drawings to be referred with continuation reference.
- k) Direction of gas flow shall be indicated in each of the drawings.
- l) Text on the as laid drawing should be clearly visible.
- m) Land base features shown on the drawing shall match the exact distance as they were on real ground with respect to scale (1:200).
- n) As laid drawings shall be duly signed & stamped by area TPIA / PMC.

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




## 27.0 CIVIL WORKS

The contractor has to supply the adequate materials and skilled manpower for the completion of all the civil works. The contractor shall also ensure that the work is carried out as per the details mentioned in the Schedule of rates.

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

The contractor has to ensure that sample of the all the materials shall be inspected and approved by EIC before carrying out installation or erection work. The contractor has to submit the test certificates for all the materials to be used at the site. The construction shall be carried out strictly as per the drawings provided by the OWNER/PMC. The contractor shall ensure extra / surplus materials / malba shall be immediately removed from the site after completion of the job.

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**ANNEXURE # 1**

**TOOLS & EQUIPMENTS TO BE PROVIDED BY THE CONTRACTOR FOR PE LAYING**

Sl. No.	Equipment Details	Indicative Requirement (In Nos.)
1	Automated Electro Fusion Machine	2
2	Voltage Stabilizer	2
3	Generator (5.5 KVA)	2
4	Moling Equipment (for all sizes)	As and when required
5	HDD Machines & Equipment (for all types & sizes)	As and when required
6	Squeeze Tools (Manual)	4
7	Squeeze Tools (Hydraulic) from 63 mm upto 125 mm	2
8	Rotary Peelers	2
9	Universal Scrapers	2
10	Tapping Tools/Allen Keys	Three sets of all sizes
11	Pipe Cutter (Round)	2
12	Pipe Cutter (Guillotine)	2
13	Gas Detection Unit	As and when required
14	Cable and Pipe Locator	As and when required
16	Pipe Alignment Clamps	2
17	Joining Clamps for Coupler (All sizes)	2
18	Joining Clamps for Saddle (All sizes)	2
19	Pipe Straightener	2
20	Re-rounding Tools (All sizes)	2
21	Jumping Jack Compactor	As and when required
22	Roller for Asphaltting	As and when required
23	Calibrated Pressure Gauges (0-10 Bar) *	10
24	Water Tankers	As and when required
25	Heating Element for HDPE Butt Joint along with clamping, roller and other accessories.	As and when required

**Note:** \* All Pressure Gauges (0-10 Bar) shall be calibrated at every Six months.

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## **ANNEXURE # 2**

### **RESTORATION PROCEDURE / GUIDELINES FOR ROAD CUTS**

#### **1.0 PURPOSE AND OBJECTIVE**

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

#### **2.0 DOCUMENTS/FILES TO BE MAINTAINED:**

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

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




#### **3.0 RESTORATION OF TRENCHES/PITS**

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

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

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

Sl. No.	Surface Types	Specification Recommended
1	Cement Concrete Surface	Top Surface – PCC 1:2:4, 100 mm Thick Compacted with Plate Vibrator shall be laid over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
2	Brick Soiling	Top Surface – Brick Soiling (as per original type) shall be laid over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
3	Interlocking CC Paver Block	Top Surface – Interlocking CC Paver Blocks (as per original type) shall be laid over compacted fine sand 50 mm Thick over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
4	Chequered Cement Concrete Tiles/Pre-cast CC Tiles/Kota Stone Floor/Red Stone Floor	Top Surface – Tiles/Floor (as per original type) shall be laid over Cement Sand Mortar 1:6, 20mm Thick over base course, Joints shall be pointed/finished to match colour. Base Course – PCC 1:5:10, 75 mm Thick laid over

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		compacted backfilled earth.
5	Bituminous Surface (for Category D Roads i.e.; Roads less than 13.70 M width)	Top Surface – 40mm Thick Bituminous Concrete (as per original type) shall be laid over PCC 1:2:4, 100 mm Thick over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
6	Bituminous Surface (for Category C Roads i.e.; Roads less than 18 M width but greater than 13.70 M width.)	Top Surface – 40mm Thick Bituminous Concrete (as per original type) shall be laid over PCC 1:2:4, 150mm Thick over base course. Base Course – PCC 1:5:10, 150 mm Thick laid over compacted backfilled earth.

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

**NOTE:**

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




#### **4.0 TESTING OF CONSTRUCTION MATERIALS**

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

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

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

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

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

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

## **5.0 INSPECTION BY THIRD PARTY INSPECTION AGENCIES (TPIA) NOMINATED BY LAND OWNING AGENCIES**

It is the responsibility of the contractor to give inspection call, at least one week in advance to OWNER/PMC, to arrange for inspection by TPI nominated by land owning agencies along with the file containing all documents mentioned in Clause No. 2 of this document. Before inspection by TPI nominated by land owning agencies, contractor has to arrange for the inspection of the restored area by OWNER/PMC/TPI and get the work certified. Contractor has to arrange for all necessary equipment, tools & tackles, labour for carrying out the inspection of the restored area. It is the responsibility of the contractor to obtain “No Objection Certificate” (NOC) from the TPI nominated by the land owning agencies and further NOC from Land Owning Agencies and to get the securities/Bank Guarantees paid to them, for obtaining the permissions.

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## CENTRAL U.P. GAS LIMITED (CUGL)

### LAYING OF MDPE NETWORK AND GI / Cu INSTALLATION WORK ALONG WITH REGISTRATION OF DOMESTIC CUSTOMERS" FOR CUGL IN KANPUR, UNNAO & BAREILLY GA IN U.P GA

PTS - INSTALLATION OF ABOVE GROUND GI PIPING & FITTINGS

0	26.05.2021	Issued for Work	PM	NN	NN
<b>Rev.</b>	<b>Date</b>	<b>Description</b>	<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>



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## 1.0 GENERAL INFORMATION

### 1.1 Introduction

CENTRAL U.P. GAS LIMITED (CUGL) plans to augment PNG network. It supplies natural gas to Domestic, Industrial & Commercial consumers in the city of Kanpur, Unnao & Bareilly.

The main scope of this contract comprises the installation of above ground pipes from the outlet of 'PE/GI transition fitting' up to the meter regulator as per the Distribution schedule placed in enclosed drawing.

The scope includes installation & procurement of above ground GI pipes and associated fittings including isolation valve for commercial/Domestic Customers.

Except Regulator/MRS/Metering Skid/DRS/DCU/Meter, Contractor shall procure each material (GI pipe, GI fittings, Isolation Valve etc.) which is required from the outlet of PE / GI transition fitting up to the Domestic / commercial customers' meter regulator.

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 U.P. GAS LIMITED (CUGL)
PMC	TRACTEBEL Engineering Private Ltd.,
PTS	Present <<Particular Technical Specification>>and its entire appendix, if any.
TPIA	Third Party Inspection Agency
EIC	Engineer – in – charge

## 3.0 SCOPE OF WORK

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

- 3.1 Plan and prepare a schedule for execution and work implementation as per QA / QC plans to be issued by Owner / Owner's representative. Contractor has to submit the Construction/Execution procedures before commencement of work to Owner / Owner's representative for approval.
- 3.2 Contractor shall submit the 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.
- 3.3 Receipt of Regulator/MRS/Metering Skid/DRS/DCU/Meter as a free issue items from Owner's stores, loading, transportation, unloading at project site. Proper storing, stacking, identification, providing security and insurance during and before installation and commissioning of pipelines. Obtaining the approval for optimum route and permission for work from the concerned authority and EIC.
- 3.4 Selection of route with the EIC / Consultant and marking the same on walls/floors between 'transition fitting' to 'cooking oven/stove/appliance', making openings and making provisions for fixing clamps. Making temporary but stable platforms/scaffolding/rope ladder etc., required for installation of pipes/fittings at all heights/multi storied flats and locations.
- 3.5 Contractor shall procure all material except free issue items for installation at the outlet of PE/ GI transition fitting upto the Domestic customers "Appliance /stove / oven for satisfactory completion to the owner/owner's representative.
- 3.6 Supply and Installation of powder coated GI pipes of ½" & ¾" dia. between transition fittings to meter regulator including NPT threading of GI pipes, supply of proper seal outs for threads to join fittings such as

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elbows, tees, connectors, etc., as per laid procedures and specification including clamping and sealing etc. The scratched powder coated GI pipe and fittings shall be painted after the testing of the GI installation.

- 3.7 Contractor shall procure the materials such as GI Pipes (1/2" & 3/4"), GI fittings, Brass fitting, Copper Pipe (12mm) etc. for required connections except free issue materials.
- 3.8 Free issue materials such as Meter, Regulator, MRS/ DRS, DCU, Isolation Valve and Appliance Valve.
- 3.9 Supply of clamps for fixing pipes wherever required, painting of scratched powder coated 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 be complete as per specification.
- 3.10 Cleaning, flushing, pneumatic testing and commissioning to the GI pipe & fittings, valves etc as per specification and hand over the same to Owner/Customer to the entire satisfaction of EIC / CONSULTANT.
- 3.11 Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.
- 3.12 Restoration of walls, flooring and other damages while executing the above ground installation.
- 3.13 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.

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

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

Service Regulator/MRS/Metering Skid/DRS/DCU/Meter 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 coated GI Pipe & GI fittings, Isolation Valve with other material which is required to satisfactory completion / safety / statutory of the works as per tender at no extra cost to Owner. The OWNER logo shall be marked on the material supplied by contractor. The contractor shall take approval from owner / owner representative for marking on the material to be procured by contractor before placement of order.

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

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

The contractor has to ensure the availability of DG sets for continuous powder supply. In case the powder 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 powder supply.

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

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

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

##### **4.2.1 Plant and Equipment**

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

#### 4.2.2 Sealant, Grout

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

#### 4.2.3 Clamps, Rawal Plugs, Screws and Nozzles etc.

The Clamps, Rawal Plugs, Screws, Nozzles, etc. shall be approved lot wise by EIC prior to installation. The quality of materials procured will be got approved and will be as directed by EIC.

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

#### 4.2.4 Consumables 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.

#### 4.2.5 Other Materials

The contractor shall supply & Installation the following items wherever required:

- All materials required for work, NPT threading, testing etc.
- All signs, barricades, lights and protective equipment.
- All material required for working at higher floor levels (i.e., scaffolding, Ladder, Safety Belts, Self Locking Safety Harness Belts etc.).
- Special consumable such as grease for maintenance of domestic appliances, all paints for painting of scratched portion of powder coated GI Pipes, GI fittings, Regulator Boxes, Consumables such as Teflon Tapes, Flux, Lacquer, Thinner, Petrol, Diesel, Fuels and Oils required are to be supplied by the contractor and are included for within the rates.
- All minor items not expressly mentioned in the contract, but which are necessary for the satisfactory completion and performance of the work under this contract.

#### 4.3 Acquisition, Receipt and Storage of Materials

**The Contractor shall collect DRS/DCU/MRS/Metering skid, Meters & Regulators from Owner's designated stores in between the hours to be advised by the EIC and installation of the same items.**

The contractor shall carry out assessment of material required for GI installation in allocated area. After approval from Owner, contractor shall place order for purchasing of GI Pipes & fittings and Isolation Valve (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.

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 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 EIC shall duly note any damage or defect in a site instruction book and both parties shall countersign the entry.

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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 logbook 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**

- 5.1 The contractor will be required to carry out GI installation in the areas where MDPE laying is under progress. However, testing of GI installation shall be done in conjunction with laying of MDPE Service Lines to respective premises.
- 5.2 The rates to be quoted by contractor shall be inclusive of all preparatory/bye works, platform materials, labour, , supervision, tools, taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.
- 5.3 The schedule of items of GI installations have been described in brief and shall be held to be completed in all respect including safety requirements as per PTS of HSE, tests, inspection, QA/QC works, enabling and sundry works. The payment shall be made against completed and measured works only. No extra works whatsoever shall be considered in execution of these items.

## **6.0 EXTRA GI FLOW CHART**

- 6.1 Initially, a survey report shall be generated by contractor duly certified by TPI/PMC on the basis of technically feasible route to calculate the approximate measurement of total pipeline as well as extra GI/Cu pipeline along with tentative amount for installation of extra GI/Cu amount as per applicable rate + 18% GST. The same survey report shall be shared with customer and should be signed through customer before start of work.
- 6.2 After completion of work, Contractor will take actual measurement and the same shall be shared with the customer. Copy of same report shall be signed by customer. Customer has to provide the cheque in favor of CUGL against the cost incurred for installation of extra GI/Cu pipeline to the contractor.
- 6.3 Contractor will collect cheques from customer and submit to project department of CUGL along with a format duly filled with required details of extra GI/Cu & rate etc on weekly basis.
- 6.4 Project team will verify the cheques, rate charged by the contractor & other details. After verification of details filled in format, project department will submit all cheques to Finance Department for clearance. (Soft copy of format will be shared with finance department)
- 6.5 Finance department will provide details regarding clearance of cheques in prescribed format. (Cleared/ cheque bounced /under clearance).
- 6.6 In case of cheque bounce, Rs.250/- cheque bouncing charges shall also be borne by the customer.
- 6.7 After the clearance of cheques in bank, finance department will generate invoices against installation of extra GI/Cu pipe & the date of invoices shall be the date of clearance of cheques in the bank.
- 6.8 After the issue of invoices against installation of extra GI/Cu pipe, finance department will hand over the invoices to Marketing Department for distribution to the customers.

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- 6.9 After the confirmation received from finance department regarding the clearance of cheques against extra GI/Cu pipe, concerned contractor shall claim 100% extra GI payment in separate invoice duly certified from TPI/PMC & Project department against cleared cheques as per SOR rate + 18 % GST.

## **7.0 PROGRESS OF WORK**

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

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

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

## **8.0 WORK SHEETS**

- 8.1 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, signed & dated as certified, on site. The cards will then be approved by the EIC.
- 8.2 Measurement sheets shall be prepared based on the RFC cards and checked and certified by the site engineers for billing purpose.
- 8.3 If measurement sheets submitted are illegible, incomplete or incorrectly booked they will be returned to the contractor.

## **9.0 CO-ORDINATION /LIAISON**

- 9.1 Contractor shall be responsible for co-ordination with 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.
- 9.2 The prospective bidder shall work in close consultation/coordination with the EIC.
- 9.3 The prospective bidder shall not sign/execute any agreement and/or undertaking on any such documents which amounts to be undertaken by Owner. The same shall only be signed and executed by Owner; however, the prospective bidder shall also liaison and coordinates for the same.
- 9.4 The necessary coordination, liaison and arrangements for inspection and approval shall be the contractor's responsibility. Inspection and acceptance of the work by authority shall not relieve the contractor from any of these responsibilities under this contract. The contractor shall plan the execution of work in such a manner so that all the registered customers are attended in phased manner. However, it is the contractor's responsibility to fix a firm appointment with the consumer for carrying out the work.
- A logbook/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.
- 9.5 The contractor is also required to obtain a "Labour License" from the Assistant Labour Commissioner of respective Administration/Central Govt.
- 9.6 It will be the contractor's responsibility to familiarise himself and comply with, any other local rules, regulations or statutory requirements applicable to the work.
- 9.7 The contractor has to take responsibility of the actions of supervisors, plumbers and helpers provided by him.

## **10.0 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.



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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.

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

The route of the pipeline to be installed shall be decided with consent of the consumer and Site Engineer/EIC. 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 landowners and tenants and shall be responsible for all damages caused by the construction and use of such approaches, pavements, gardens, rooms, walls, roof etc., at no extra cost to 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 as sketch of the agreed pipe routes, if necessary.

The contractor will be responsible for contacting the Customer and making the necessary arrangements for access and appointments to carry out the work. Owner will not be responsible for any time lost due to 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 carryout all necessary preparatory work if needed to permit the passage of men and equipment. Lights, Curbs, signs shall be provided wherever and/or required by the Owner necessary to protect the public.

## **12.0 PROTECTION OF STRUCTURES AND UTILITIES**

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

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

## **13.0 GI ABOVE GROUND SERVICE PIPE**

The GI service pipe installation work includes all work necessary to connect from the PE/GI transition fitting on the down-stream of the PE service, to the Customers appliance, including the installation of regulator, valves, fittings, 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.

All 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 form 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

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 EIC for every fresh lot of the clamps, brackets, regulator boxes and other consumables, prior to start of installation. The detailed cross sectional of Powder coated GI Pipe Clamps/Meter brackets are as per enclosed Drawing in the tender.



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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 centre line of fittings at every sides. However, the same may be changed as per site conditions/as directed by EIC. Minimum gap between pipe & wall shall be 25 mm. The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation.

Where pipe passes through 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 bevelled such as to prevent an accumulation of water. Supply of clamps for all sizes of the GI pipes is in contractor's scope. Contractor has to take prior approval for design/types of clamps, paintings etc.

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.

The rates for providing a connection are payable depending upon the length of the GI pipe installed from Transition fittings to meter regulator. It also includes the installation of service regulator with associated inlet connections and outlet connection shall be proper sealed so that foreign particles cannot be entered, on the wall with approved powder coated meter brackets and angles, painting, testing upto meter regulator **The Pipe installation includes all type of Pipe & Fittings (GI Pipe & Fittings, Isolation valve etc.)**

**Except Regulator/MRS/Metering Skid/DRS/DCU/Meter, Contractor shall procure all other materials (i.e. Pipe, fittings, Isolation & Appliance Valve clamps etc.) as per attached specification for installation and to the entire satisfaction of EIC/consultant.**

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

#### **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) PAINTING (for scratched powder coated pipes and fittings only)**

- One coat of Primer Application (Appropriate Zinc based primer)
- Two coats of synthetic enamel paint – canary yellow of minimum of 30 microns per coat of reputed make like Asian, Berger, Nerolac. (No other make shall be used for painting).

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

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

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

##### **(b) POWDER COATING**

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

## **14.0 TESTING OF GI PIPE INSTALLATION**

- 13.1 The installation from PE/GI transition fitting up to regulator shall be tested at the pressure of 6.0 bar (g).

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- 14.2 The testing of GI riser pipe up to meter regulator shall be done with the isolation valve in open condition and open end plugged.
- 14.3 The 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.
- 14.4 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 the start of the execution work.
- 14.5 The pressure gauges shall be calibrated from time-to-time as desired by EIC but positively once in every six months.
- 14.6 The details of testing shall be properly recorded in the GI/Copper cards.

## **15.0 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.

## **16.0 PURGING & COMMISSIONING**

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

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

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

- Ensure the method of purging is such that no pockets of air are left in any part of the Customer's piping.
- Ensure that all appliance connections are gas tight, all appliance gas valves are turned off and there are no open ends.
- Where possible, select an appliance with an open burner at which to commence the purge i.e., a hotplate burner.
- Ensure the area is well ventilated, and free from ignition sources.
- Ensure branches that do not have an appliance connected are fitted with a plug or cap.
- Turn on one burner control valve until the presence of gas is detected. A change in the audible tone and smell is a good indication that gas is at the burner. Let the gas flow for a few seconds longer, then turn off and allow sufficient time for any accumulated gas to disperse.
- Turn on one gas control valve again and keep a continuous flame at the burner until the gas is alight and the flame is stable.
- Continue to purge until gas is available at other appliances.

## **17.0 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/ Institutional areas), contractor has to restore the area according to CPWD specifications and obtain a NOC / Clearance certificate from the concerned authorities maintaining the flats, after completion of the work.

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

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

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

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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.

## 18.0 SUBMISSION OF FINAL RECORDS

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

- a) Total material consumption report.
- b) Material reconciliation with respect to the materials issued.
- c) Test reports & calibration certificates of gauges etc.
- d) Any other documents/records required.
- e) Extra Piping details

**ANNEXURE # 1**

**TOOLS & EQUIPMENT TO BE PROVIDED BY CONTRACTOR FOR GI/COPPER WORK FOR BUILDING  
OF HEIGHT BELOW 20 METERS**

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 toolboxes	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 tube 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 powdered torches	2	2
24	Measuring tape 30 m	1	2
25	Wire brush	1	2
26	Portable pipe vice & tripod	-	2
27	Set steel twist drills 0.5-2.0 mm (for appliance conversion)	-	1
28	Set steel twist drills 1mm-10mm	-	2
29	Set masonry drills 1mm-10mm	1	2
30	Graphite based grease	As required	As required

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31	Lubricating oil	As required	As required
32	Hand cleaner	As required	As required
33	Copper tube Cutter 12mm	-	4
34	GI Pipe Cutters ½"	-	2
	Gas Detection Equipment	As required	-
	Powder 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
35	Automatic Thread cutting machine	-	2
36	GI Pipe Cutter	-	2

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## **CENTRAL U.P. GAS LIMITED (CUGL)**

### **LAYING OF MDPE NETWORK AND GI / Cu INSTALLATION WORK ALONG WITH REGISTRATION OF DOMESTIC CUSTOMERS" FOR CUGL IN KANPUR, UNNAO & BAREILLY GA IN U.P. GA**

#### **PTS - ELECTROFUSION FOR PE PIPES & FITTINGS**

0	26.05.2021	Issued for Work	PM	NN	NN
<b>Rev.</b>	<b>Date</b>	<b>Description</b>	<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>

At the helm of the Energy Transition, Tractebel provides a full range of engineering and advisory services throughout the life cycle of its clients' projects, including design and project management. As one of the world's leading engineering and advisory companies and with more than 150 years of experience, it's our mission to actively shape the world of tomorrow. With about 5,000 experts and presence in more than 70 countries, we are able to offer our customers multidisciplinary solutions in energy, water and urban.

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