

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

E-Tender ID -

Project No. P.014714

Document No. P.014714 G 11031 R006


Tender No. P.014714 G 11031 R006

CENTRAL UP GAS LIMITED (CUGL)
KANPUR | INDIA




PUBLIC

27 May 2021

TECHNICAL DOCUMENTATION
Technical, Vol II of II, Rev. 1

		MAIN TABLE OF CONTENTS 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 UP			P.014714 G11031 R006
SL.NO.	DESCRIPTION	DOCUMENT / DRAWING NO.	REV. NO	PAGE	PAGE Nos.
	NIT				
I	SECTION A - COMMERCIAL (VOLUME I OF II)				
1	SECTION-I INVITATION FOR BID (IFB)	P.014714 G11031 R006	1		1 to 99
2	SECTION - II INSTRUCTION TO BIDDERS (ITB)				
3	SECTION - III GENERAL CONDITIONS OF CONTRACT (GCC)				
4	SECTION - IV SPECIAL CONDITIONS OF CONTRCT (SCC)				
5	SECTION - V FORMS AND FORMAT				
6	SECTION - VI SCHEDULE OF RATES (SOR) - FOR KANPUR, UNNAO, BAREILLY & JHANSI GA IN THE STATE OF U.P				
II	SECTION B - TECHNICAL (VOLUME II OF II)				
1	PTS INTRODUCTION	P.014714 G 11031 040	0	3	1
2	PTS LAYING OF MDPE MAIN PIPELINE & SERVICE PIPELINE	P.014714 G 11031 041	0	25	4
3	PTS INSTALLATION OF ABOVE GROUND GI PIPING & FITTINGS	P.014714 G 11031 042	0	13	29
4	PTS ELECTROFUSION FOR PE PIPES & FITTINGS	P.014714 G 11031 043	0	8	42
5	PTS HEALTH, SAFETY & ENVIRONMENT	P.014714 G 11031 044	0	21	50
6	PTS SUPPLY OF MDPE FITTINGS, VALVES AND TRANSITION FITTINGS	P.014714 G 11031 045	0	7	71
7	PTS GI PIPES	P.014714 G 11031 046	0	5	78
8	PTS GI FITTINGS	P.014714 G 11031 047	0	5	83
9	PTS WARNING MAT	P.014714 G 11031 048	0	5	88
12	PTS POWDER COATING	P.014714 G 11031 049	0	4	93
13	PTS INSTALLATION GI, COPPER	P.014714 G 11031 050	0	14	97
14	PTS COPPER FITTINGS	P.014714 G 11031 051	0	4	111
15	PTS BRASS FITTINGS	P.014714 G 11031 052	0	5	115
16	PTS CORRUGATED FLEXIBLE METAL HOSE	P.014714 G 11031 053	0	5	120
17	PTS STEEL REINFORCED RUBBER HOSE	P.014714 G 11031 054	0	5	125
17.1	PTS COPPER TUBE	P.014714 G 11031 055	0	4	130
18	GTS PE ACCESSORIES FOR UNDERGROUND NETWORK FOR NATURAL GAS DISTRIBUTION (70000 / 740 / GTS / 0011)	70000_740_GTS_0011	0	25	134
19	GTS PE COMPOUNDS FOR MANUFACTURE OF PIPES AND FITTINGS FOR UNDERGROUND NETWORKS FOR NATURAL GAS DISTRIBUTION - ACCEPTANCE PROCEDURE (70000 / 740 / GTS / 0012)	70000 / 740 / GTS / 0012	0	11	159
20	GTS PE VALVES FOR NATURAL GAS DISTRIBUTION UNDERGROUND NETWORK (70000 / 740 / GTS / 0015)	70000 / 740 / GTS / 0015	0	19	170
21	QCT MDPE FITTINGS	P.014714 G 11031 056	0	1	189
22	QCT MDPE VALVES	P.014714 G 11031 057	0	1	190
23	QCT ELECTROFUSION FITTING & TRANSITION FITTINGS	P.014714 G 11031 058	0	2	191
24	QCT GI PIPES	P.014714 G 11031 059	0	2	193
25	QCT GI FITTINGS	P.014714 G 11031 060	0	1	195
26	QCT WARNING MAT	P.014714 G 11031 061	0	2	196
29	QCT COPPER TUBE	P.014714 G 11031 062	0	2	198
30	QCT COPPER FITTINGS	P.014714 G 11031 063	0	1	200
31	QCT BRASS FITTING	P.014714 G 11031 064	0	1	201
32	QCT CORRUGATED FLEXIBLE METAL HOSE	P.014714 G 11031 065	0	1	202
33	QCT STEEL REINFORCED RUBBER HOSE	P.014714 G 11031 066	0	2	203

34	RECOMMENDED VENDORS LIST	P.014714 G 11031 067	0	5	205
35	STANDARD / PROJECT DRAWING				
35.2	TYPICAL DETAILS OF CAUTION BOARD		0	1	210
35.1	TYPICAL DETAILS OF BARRICADING		0	1	211
35.3	TYPICAL DETAILS OF RCC ROUTE MARKER		0	1	212
35.4	POLE MARKER WITH FOUNDATION		0	1	213
35.5	POLE MARKER WITH FOUNDATION (INDIVIDUAL SOCIETIES & AREAS)		0	1	214
35.6	PLATE MARKER		0	1	215
35.7	TYPICAL TRENCH DIMENSIONS FOR PIPELINE		0	1	216
35.8	TYPICAL UNDERGROUND CABLE CROSSING DETAILS		0	1	217
35.9	ROAD/HIGHWAY CASED CROSSING FOR MDPE PIPE		0	1	218
35.1	SPECIFICATION FOR WOOD SCREWS		0	1	219
35.11	HALF ROUND CONCRETE SLEEVE		0	1	220
35.12	SCHEMATIC DIAGRAM OF SINGLE STREAM SERVICE REGULATOR		0	1	221
35.13	SCHEME FOR DOMESTIC CONSUMER CONNECTION		0	1	222
35.14	SCHEMATIC DIAGRAM OF HOUSING FOR SINGLE STREAM SERVICE REGULATOR		0	1	223
35.15	BRICK VALVE CHAMBER (1.5 M X 1.0 M)		0	1	224
35.16	BRICK VALVE CHAMBER (1.5 M X 1.5 M)		0	1	225
35.17	RCC VALVE CHAMBER (1.5 M X 1 M)		0	1	226
35.18	RCC VALVE CHAMBER (1.5 M X 1.5 M)		0	1	227
35.19	TYPICAL DETAILS OF FENCING		0	1	228
35.20	TYPICAL DETAILS OF GATE		0	1	229

  	INTRODUCTION	P.014714 G 11031 040
---	--------------	----------------------------

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

INTRODUCTION

0	26.05.2021	Issued for Work	PM	NN	NN
Rev.	Date	Description	Prepared by	Checked by	Approved by







  	INTRODUCTION	P.014714 G 11031 040
---	--------------	----------------------------

TABLE OF CONTENTS

1.0	INTRODUCTION	3
------------	---------------------------	----------

  	INTRODUCTION	P.014714 G 11031 040
---	--------------	----------------------------

1.0 INTRODUCTION

- 1.1. Central U.P. Gas Limited (CUGL) is a joint venture company of Gail & BPCL is responsible for distribution of Natural Gas for Domestic, Commercial & Industrial sectors including setting up CNG refuelling stations for vehicles etc. in district of Kanpur, Unnao, Bareilly, Jhansi.
- 1.2. Central U.P. 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.

TRACTEBEL Engineering Pvt. Ltd. (TE), a subsidiary of TRACTEBEL Engineering S.A. has been appointed as Technical Consultant (hereinafter referred as Consultant), by CUGL for aforementioned of project.

The present document covers the technical specifications for the enquiry.

Σ Σ Σ

  	<p>PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p>P.014714 G 11031 041</p>
---	--	-------------------------------------

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 - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE

0	26.05.2021	Issued for Work	PM	NN	NN
Rev.	Date	Description	Prepared by	Checked by	Approved by

TABLE OF CONTENTS

1.0	GENERAL INFORMATION	3
2.0	DEFINITIONS	3
3.0	SCOPE OF WORK.....	3
5.0	MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY.....	5
6.0	PROGRESS OF WORK	7
7.0	CO-ORDINATION/LIAISON FOR PIPELINE LAYING.....	7
8.0	REFERENCE SPECIFICATION, CODES AND STANDARD.....	7
9.0	QUALITY OF WORK	8
10.0	SAFETY.....	8
11.0	ROUTE SURVEY	8
12.0	ORGANISATION STRUCTURE	9
13.0	STRUCTURES, SERVICES AND OTHER PROPERTY	9
14.0	TRENCHING.....	10
15.0	LAYING	13
16.0	JOINTING OF POLYETHYLENE PIPE	14
17.0	BACKFILLING	15
18.0	TRENCHLESS LAYING (ONLY FOR 125 MM).....	16
19.0	RESTORATION.....	17
20.0	TESTING.....	18
21.0	PURGING	18
22.0	VALVE CHAMBERS	18
23.0	PERMANENT MARKERS	19
24.0	ASSISTANCE IN COMMISSIONING.....	20
25.0	STANDARD OF WORK.....	20
26.0	RECORDING (AS-BUILT DRAWINGS)	20
27.0	CIVIL WORKS.....	21

 	PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE	P.014714 G 11031 041
---	--	----------------------------

1.0 GENERAL INFORMATION

Central UP Gas Limited (CUGL), is a joint venture of Bharat Petroleum Corporation Limited (BPCL) and GAIL (India). CUGL plans to install an underground Natural Gas Distribution network in District of Kanpur, Unnao, Bareilly, Jhansi. The objective is to supply Natural Gas to both Domestic and Commercial customers and to provide compressed gas as a fuel for automobiles. CUGL is seeking contractors to assist in meeting the above objective.

The main scope of this Specification comprises of laying of underground Medium Density Polyethylene (MDPE) main pipelines and service pipeline. The scope covers all the activities associated with the purchasing (specified items only), laying, testing and commissioning of MDPE main pipelines and service pipelines in new gas charged areas of sizes ranging from 20 mm upto 125mm OD, which includes PE/GI transition fitting above ground level and LMC work.

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 Prior to start of construction activity, contractor shall prepare route survey drawing marked for proposed gas pipeline laying and submit to OWNER/PMC for approval.
- 3.3 Co-ordination /Liaison from respective land-owning agencies such as CPWD, NHAI, etc. for road cutting for laying of the pipelines, Liaison with the concerned authorities during execution of the job, obtaining NOC from concerned authorities once the work is completed. Getting back/Refund of Bank Guarantee/security deposits made to the agencies for laying of the pipelines.
- 3.4 Obtaining clearances and coordination with concerned RWA of the allotted area for internal network laying.
- 3.5 Proper storing, stacking, providing security, insurance cover during storage, laying, commissioning and handing over the pipelines to Owner.
- 3.6 Making trial pits to determine the underground utilities/services such as existing pipelines, Cables (Electrical/Communication), Conduits, U/G drainage, Sewers, tunnels, Subways foundations etc. for deciding optimum feasible route and depths for laying the pipelines based on the route plans indicated by Owner.
- 3.7 Wherever required the grass/turfing, pavement, linings, drains roads and other such 'pucca' area shall be locally removed to facilitate trenching and pipe laying works. The same is to be reinstated as original.




  	<p align="center">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p align="center">P.014714 G 11031 041</p>
---	--	--

- 3.8 Installation of Safety/warning Signs and barricading of the entire route to be trenched. Pits to be similarly barricaded along with warning signs and caution boards.
- 3.9 To make trenches with stable slopes but restricting minimum disturbance to above ground/underground services/installation as per specifications and approved route plans keeping the trenches free from water and soil till placement of pipes.
- 3.10 Unloading/stringing the MDPE pipes of required sizes (i.e. 125, 63, 32 & 20 mm) pipes into trenches as per approved procedure.
- 3.11 Joining the pipe ends with fittings & valves by approved automated electro-fusion techniques only as per Tender Specification.
- 3.12 Laying pipelines by any methodology including trenchless technology methods with or without casing pipes (HDPE pipes) as per specifications and as directed by EIC. Casing Pipe (HDPE Pipes) shall be supplied by Contractor i.e. PE 80/PE 63, PN 6, IS 4984.
- 3.13 Fabrication, Supply and Inspection of good quality of GI sleeve and half concrete sleeves and other materials, fittings to be supplied by the contractors as per the provisions of tender.
- 3.14 Back filling and compaction by jumping jack compactor, wherever required, using approved 'good' soil or using excavated earth or borrow earth as per requirement and specifications and replacement of the tiles, slabs removed during the excavation. Cleaning all unserviceable materials, debris, excess earth trenches etc. to designated disposal area.
- 3.15 Carrying out pneumatic testing and purging as per specifications and approved procedures, providing all tools & tackles, instruments, manpower and other related accessories for carrying out the testing of pipes.
- 3.16 Supply, fabrication & Installation of RCC route marker, Pole marker with foundations, Plate markers, valve chamber etc. as per the directions of the EIC/Owner's representative.
- 3.17 Commissioning of gas in the tested PE Line shall be done as per the approved procedure.
- 3.18 Restoration of existing ground features such as grass/turfing, paving, roads, drains, concrete, floral beds, fencing, tiles, marbles, flooring masonry etc. to original condition and to match with adjoining conditions, functionally and aesthetically up to the entire satisfaction of Owner / Owner's representative /any other Third Party agency designated by Owner and local authorities, failing which, it will be done at the risk and cost of the contractor. Obtaining satisfactory completion certificates form the restoration work done from the concerned authorities.
- 3.19 Returning surplus material to Owner stores after obtaining clearance from TPIA/Consultant/ Owner, reconciliation of free issue material/consumables.
- 3.20 Handing over the completed works to Owner for their operation/use purposes.
- 3.21 Rectification of defects arising due to poor workmanship during defect liability period of pipelines / installations handed over to Owner.
- 3.22 Preparation and submission of all documents like Pit wise As graph, As-built drawings, details of crossings, utility graphs, PE cards for service line and deviation statements on completion/commissioning of work by way of drawing, sketches and tables in soft & hard copy.
- 3.23 Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to OWNER.
- 3.24 Contractor to note that sizes to be taken as precisely as per drawing given in tender document. In any case due to site constraint, sizes given in drawing may vary.

4.0 Industrial and Commercial Work

Supply and Installation of MS Pipe and Fittings




- 4.1 **Supply of Transition Fitting of 32mm x 1 Inch with coupler will be provided by the client for Industrial and Commercial Connectivity.**

  	<p align="center">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p align="center">P.014714 G 11031 041</p>
---	--	--

- 4.2 Supply & Installation of MS pipes & fittings, Installation of meter, regulators, filter etc. including NPT threading, as specified, Drillings of holes through the walls (Brick, RCCI, Granite, Marble, Wood Cutting, Glass Cutting with proper heavy duty hammer drill machine, tools & tackles using proper sealant/grout material and colors to match the original replacement of the damages during drilling, restoring the area to the original condition Painting of pipe and fittings after proper surface finish by one coat of approved primer paint and two coats of approved synthetic enamel paint.
- 4.3 Assessment of material requirement for installation at site, Purchasing of MS Pipes & fittings from approved /recommended vendors of CUGL, Scheduling, planning of material & Forwarding inspection call, getting dispatch clearance, handling, loading, transportation and unloading of these items at respective contractor's store. Receiving, taking over, handling loading, transportation and unloading of owner supplied above ground fittings such as regulators, meters, Filter, Isolation Valves and other free issue items as defined in specification from owner's designated stock yards to Contractor's own stores / work sites, proper storing, stacking, identification, providing security and insurance cover.
- 4.4 Preparation and approval of sketches, schedules & execution procedures. Finalizing optimum route with consent of customer from transition fitting to meter outlet connection (as per drawing) and ensuring installations in well ventilated area."
- 4.5 Supply & fixing of approved clamps & nylon rawl plugs with SS 304 2" screws, grout material, suitable thread sealant i.e. Teflon Tape, foining of transition fitting to above ground MS pipes, testing & Jumper, purging and commission of the complete installation.

5.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY

- 5.1 Material, Procurement and Supply
Material to be Supplied by Owner as Free Issue
- 5.2 Unless otherwise specified, Owner will only supply following material such as MDPE – pipes (125, 63, 32 & 20mm OD), Appliance Valves & Isolation Valves.
- 5.3 The free issue material shall not be procured from any other source by contractor. (Only from recommended vendor list).
- 5.4 Material reconciliation statement of free issue material duly certified by Owner and PMC shall be submitted to OWNER on monthly basis.
- 5.5 **Material to be supplied by the contractor:** The supply of items as indicated in **SOR** shall be strictly as per relevant Technical Specifications enclosed with the Tender and as per guidelines of various clauses of SCC and **SOR**. All materials shall be handled safely and stored in a permanent, covered, lockable store/ware house preferably near site in such a manner as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals. The MDPE pipes and fittings shall be stored in covered storage to protect material from sunshine, rain etc.
- 5.6 **Contractor shall procure all MDPE fittings & MDPE Valves.**
- 5.7 Contractor shall procure the materials such as HDPE Casing Pipes & required fittings and Warning Mat etc.
- 5.8 Backfilling material
The Contractor shall be responsible to arrange the supply of approved coarse sand (size 0.6 – 2 mm as per IS 383) free from any impurities like clay, mica, and soft flaky pieces, as per the instructions of EIC/Owner's representative. **For supply of sand in trench for rocky terrain, no separate charges are payable and is included in rates - excavation of hard rock / Morrum.** Also, supply of sand in Valve Chambers, Normal surface & built up surface, if required, as per the instructions of EIC, is not separately payable.
- 5.9 In case specified trench, depths are not achieved & if directed by Engineer-In Charge Contractor has to provide concrete casing pipes / slabs or cement concrete, without any cost implication to Owner.
- 5.10 **Other Materials:** The Contractor shall supply the following items wherever required:
 - All materials required for framework, trench support and temporary trench crossings.

  	<p style="text-align: center;">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p style="text-align: center;">P.014714 G 11031 041</p>
---	---	---

- All sign boards, barricades, tin sheets, lighting arrangement and protective equipment.
- All minor items not mentioned in the Contract but necessary for the satisfactory completion and performance of the Work under this Contract.
- Material required for installation of valve chambers.
- GI/ Half Round Concrete Sleeves.
- Permanent markers with foundation

5.11 Manpower

The Contractor shall provide the skilled labour, tools, material and equipment necessary for the proper execution of the Work.

5.12 Equipment, Machinery & Tools

This will include but is not limited to the list of specialized items included in Annexure # 1.

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

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

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

5.15 Acquisition, Receipt & Storage of Materials

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




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

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

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

The Contractor shall 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.

In case of non-submission of material reconciliation on first week of every month, applicable penalties shall be levied as per SCC from the running bills.

  	<p align="center">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p align="center">P.014714 G 11031 041</p>
---	--	--

6.0 PROGRESS OF WORK

The contractor shall proceed with the work under the contract with due expedition and without delay. The EIC may direct in what order and at what time, the various stages or parts of the work under the Contract shall be performed. Contractor has to regularly submit daily progress reports, weekly progress reports, graphs with utilities, testing reports, material consumption and inventory reports, deviation statements, completion schedule etc.

7.0 CO-ORDINATION/LIAISON FOR PIPELINE LAYING

Contractor has to CO-ORDINATE from statutory bodies for laying of pipelines. Statutory bodies in this case are NHAI, CPWD, Indian Railways, LDA and any other Government Agencies who maintains the public lands and accord permissions for laying of the utilities. The contractor shall obtain demand note (Road Restoration charges) from these statutory bodies. Contractor shall ensure that the Road Restoration Charges are to the minimum against the work to be carried out. OWNER may return back the demand note, if the Road Restoration charges are not found reasonable then OWNER shall not be liable to pay any Road Restoration Charges against the same to Concern Authority.

However, OWNER will pay the road restoration / Departmental charges / security deposit / Bank guarantees for getting the clearances from statutory bodies. It is the contractor's responsibility to inform and co-ordinate the concerned local authorities and also other utility agencies before and after the commencement of work at site. To ensure smooth execution of the work on a day-do-day basis, the contractor has to liaison with respective authorities. The contractor shall plan and ensure that work taken up under a single permission shall be completed within the stipulated time period and revalidation process is avoided. No separate Road Restoration Charges are liable to OWNER for revalidation cases.

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

On behalf of the owner, contractor shall prepare in advance and submit the proposed route plan complete in all respect and well ahead of time so that the actual construction work is not delayed because of approval/inspection / permission by concerned authorities. Further, the contractor shall also coordinate with the relevant authorities for necessary approvals of these proposed pipeline route drawings / certificates. The inspection of work by statutory authorities shall be the responsibility of the contractor without any extra cost to OWNER.




In case contractor delays laying of pipeline work under a single permission, the work or part of work may be offloaded to some other contractor on his risk and cost.

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

8.0 REFERENCE SPECIFICATION, CODES AND STANDARD

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

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

  	<p align="center">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p align="center">P.014714 G 11031 041</p>
---	--	--

9.0 QUALITY OF WORK

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

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

Fusion operators and other skilled personnel shall be approved by Owner / Owner's representative and identification cards duly signed by EIC shall be issued to them. Only those personnel who are approved by EIC shall be allowed to execute the critical activities like Electro fusion jointing of MDPE Pipes & Fittings. OWNER may provide Training and certification on chargeable basis where the cost shall be borne by contractor.




10.0 SAFETY

- 10.1 The Contractor shall conform to the safety requirements outlined elsewhere in the tender document. In addition, the Contractor shall observe safe working practices in the storage and handling of cleaning fluids, flammable fluids, etc, and ensure smoking or naked flames are not permitted in the vicinity when these materials are being used.
- 10.2 Trench walls shall be battered with sufficient slope in order to minimize a trench collapse. Where there is a danger of an earth slide or collapse, the trench shall remain open for the minimum time possible with proper barricading. The Contractor is to ensure that no person enters a trench, which is of a depth of 1.5 meters or greater, unless the trench has adequate shoring, or the sides are battered to such an extent as to prevent a trench collapse.
- 10.3 The Contractor shall also protect all work sites with warning signs, barricades and night lighting. The Contractor shall inspect all fenced excavations daily and maintain them in good order.
- 10.4 The trenches/ pits shall not be kept open in night times. However, in case the same is essential the same shall be properly barricaded with proper lighting arrangements & manned.
- 10.5 The Contractor shall provide PPE's like helmets, safety shoes, etc. to the labour which are necessary for safe working practice.
- 10.6 Any accident causing injury to any person or damage to property or equipment shall be reported to the EIC and the cost of repair / replacement of the damage equipment shall be borne by the contractor. Where the EIC determines that the work is being performed by the Contractor in an unsafe manner, he may suspend the Work until corrective action is taken by the Contractor.
- 10.7 For further details Refer "Special Terms and conditions of Contract" and attached PTS – Laying of MDPE Main Pipeline and Service pipeline.

11.0 ROUTE SURVEY

- 11.1 Planning, detailing the size, underground utilities, foreign pipelines, crossings, and location of valve chamber, FRS / DRS / MRS as well as service line location.
- 11.2 Main lines

The final alignment of mainlines will be worked out at site in consultations with the Owner /Owner's representatives after route survey and trial pits, at contractor cost. Any change in routing from the issued drawings due to site constraint will be notified to EIC & his specific written approval shall be obtained before carrying out the job.
- 11.3 Service lines
 - Consultant/Third Party Inspection Agency and the contractor will conduct a joint survey at each probable premise / housing colony/pockets/area to be supplied with gas. The survey record will note customer's detailed potential gas supply points, proposed regulator positions and estimates of material quantities. The contractor's representatives will make sketch of the agreed pipe routes.

  	<p align="center">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p align="center">P.014714 G 11031 041</p>
---	--	--

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

12.0 ORGANISATION STRUCTURE

- 12.1 Contractor shall designate Project Manager / Coordinator who will be responsible to interact with EIC/Consultant/TPIA and authorized to attend review meetings, receive material, authorized to sign documents, claims and receive payments etc. Contractor shall employ a Project Manager / Coordinator on company roll. The Project Manager / Coordinator must have qualification of BE / Diploma in Engg. with min. 5 - 8 years of work experience in gas pipeline job respectively. He shall be single point of contact for all the works and must represent company in the review meetings.
- 12.2 All construction work will be carried out as per direction of EIC, and this will be the primary point of contact between the contractor and Owner on site. All work will be issued and sanctioned through the EIC and site control exercised by Site Engineers. The contractor shall ensure that technical quality standards are maintained that construction is carried out cost effectively and that a good customer and public image is maintained for Owner.
- 12.3 The contractor will deploy his own supervisors as directed by site engineers/EIC. These personnel will be reporting to the Site Engineer for monitoring construction standards and for ensuring that all technical requirements are met for the job being carried out. The contractor's supervisor(s) will have day-to-day liaison with the Site Engineer and will provide the Site Engineer with technical reports and audits, and other management information as is required on work progress and construction quality standards.
- 12.4 The contractor's supervisor shall have mobile telephones to ensure that they can be contacted at all times. The contractor will also nominate one person who can be contacted if necessary, in odd hours, for the duration of the works. The contractor's supervisor will have access to transport at all times to allow them to visit sites and attend meetings with Owner. The normal day-to-day issue of work instructions, communication between Owner and the contractor's supervisor and the Site Engineer.

13.0 STRUCTURES, SERVICES AND OTHER PROPERTY

13.1 Location of Underground Utilities

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




In addition, the contractor shall excavate trial pits as necessary to determine the pipe route. The number of trial pits will be agreed with the Site Engineer in advance of any excavation. In any event, trial pits shall be made at intervals of a maximum of 30 meters. Restoration of the abandoned trial pits and trenches shall be the contractor's responsibility. No payments shall be made for such type of jobs. The trial pits shall be excavated to minimum depth of 1.5 meters so as to locate any utilities present in the trench.

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

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

13.2 Protection of Structures and Utilities

The Contractor shall at his own cost support and protect all buildings, walls, fences or other structures and all utilities e.g. Electrical cables, Telephone Cables, Water pipelines, Sewer pipelines etc., and property which may be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work. Special care shall be taken while laying of pipelines near the trees.

  	<p align="center">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p align="center">P.014714 G 11031 041</p>
---	--	--

13.3 **Interference with Traffic, Street Drainage and General Public**

The Work shall be executed in such a manner so as to cause a minimum inconvenience to persons using public or private roads, lanes, thoroughfares, walkways, rights-of use or passages through which the Works are to be executed. The trench shall be back filled, compacted, levelled and extra soil shall be removed immediately after laying of pipeline to avoid public inconvenience. Closure of roads, etc, shall not be permitted without the approval of the EIC.

The Contractor shall comply with all local Authorities requirements to traffic and keep roads open to traffic and maintain access to and within any private property.

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

The Contractor shall not use a private driveway, access track or entrance without the prior approval of the EIC in any circumstance.

The Contractor shall provide suitable access wherever necessary in the form of temporary bridges, culverts, flumes, etc., of a size and type approved by the EIC.

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

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

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

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

14.0 **TRENCHING**

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

The Contractor shall perform the excavation works so as to enable the pipe to be laid in conformity with the levels, depths, slopes, curves, dimensions and instructions shown in the Drawings, Specifications or as otherwise directed by the EIC.

Contractor shall excavate and maintain the pipeline trench on staked centreline as per approved drawing taking into account the horizontal curves of the pipelines.




While trenching, care shall be taken to ensure that all underground structures and utilities are disturbed to the minimum. Suitable crossing shall be provided and maintained over the ROU wherever necessary to permit general public, property owners or his tenants to cross or move stock or equipment from side of the trench or another.

Trenching shall be made with sufficient slopes on sides in order to minimize collapsing of the trench. On slopes wherever there is danger of landslides, the pipeline trench shall be maintained open only for the time strictly necessary. Owner may require excavation by hand, local route and detouring and limiting the period of executing of the works. Before trench cuts through water table, proper drainage shall be ensured, both near the ditch and ROU in order to guarantee the soil stability.

The Contractor shall ensure that trench bottom is maintained in the square form as far as possible, with equipment, so as to avoid/minimize the hand grading at the bottom of the trench. The Contractor shall do all such handwork in the trench as required to free the bottom of trench from loose rock, pebbles and to trim protruding roots the bottom and sidewalls of the trench.

14.1 **Depth of Trench**

The minimum depth of cover shall be measured from top of pipe to the top of undisturbed surface of the soil or top of the graded working strip or top of road or top of rail, whichever is lower.

  	<p style="text-align: center;">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p style="text-align: center;">P.014714 G 11031 041</p>
---	---	---

In case of crossing of water bodies, the minimum depth shall be measured from the top of the pipe to the bottom of Scour level.

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

For Distribution and service lines

- Minor Water Crossing/Canal 2.5 meter
- Uncased/Cased Road Crossing 1.5 meter
- Rail/Road Cased Crossing 1.5 meter
- Normal Areas 1.0 meter

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

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

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

14.2 Width of Trench

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

14.3 Trench Base

The trench bottom shall be cut or trimmed to provide a uniform bedding for the pipe and shall be free from stones, metal, wood, vegetation, clods of earth or other debris before placement of the pipe.

In case trenching is done in rocky terrain, a bedding of soft soil or sand shall be provided in the trench base to the satisfaction of EIC.

Hard Rock:

Hard rock is defined as trench material with a single piece of rock, dimension exceeding 1.0 m in any direction, which requires cutting only by use of chisel / pneumatic chisel / drill or sledge hammer or removal of the same by additional excavation. Additional rates shall be payable for hard rock excavation as per the **SOR item no. (refer in SOR)** over and above the pipeline laying rates. Excavation through soil mixed with small boulders that have been used for a road base will not be considered as hard rock for the purpose of payment.




Murram

It shall be obtained from pits of weathered disintegrated rocks. It should preferably contain siliceous material and natural mixture of clay of cal carious origin. The size of the Murram shall not be more than 20 mm. Murram for filling shall be clean and well graded. Murram shall not contain any vegetation, organic, clayey or other material. Additional rates shall be payable for Murram excavation as per the **SOR item no. (refer in SOR)** over and above the pipeline laying rates.

Boulder

It is a rock with grain size of usually not less than 256 mm (10 inches) diameters. Additional rates shall be payable for Boulders excavation as per **SOR item no. (refer in SOR)** over and above the pipeline laying rates.

14.4 Clearances

  	<p align="center">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p align="center">P.014714 G 11031 041</p>
---	--	--

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

- 150 – 300 mm where the gas pipe crosses other assets/utilities, etc., for electric cables, the clearance shall be 300mm minimum or special protection shall be provided as per approval of EIC.
- 300mm where the gas pipe is on a similar alignment to the other assets/utilities.

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

14.5 Under Ground Interferences

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

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

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

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

14.6 Others

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

For all roads, paths, walkways etc. which are open cut, the Contractor shall provide temporary diversions properly constructed to allow the passage of normal traffic with the minimum inconvenience and interruptions.

The paving shall be restored to its original condition after the pipeline is installed.

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




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

The trench shall be cut to a grade that will provide a firm, uniform and continuous support for the pipe.

The Contractor shall take conducive measures to ensure the protection of underground utilities as per the instructions of Owner or relevant authorities.

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

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

  	<p align="center">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p align="center">P.014714 G 11031 041</p>
---	--	--

14.7 Bedding

The Contractor shall ensure that the pipe when placed in the trench is supported and surrounded by a bed of screened excavated soil, which shall be stone free and have a maximum grit size of 5mm, in order to ensure no damage occurs to the pipe. However, in case of rocky soil the bedding shall be done with approved good quality packing sand subject to the approval of the Site Engineer. The packing sand shall be placed to a minimum thickness of 150mm around the pipe in case of rocky terrain.

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

15.0 LAYING

Main line

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

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

In case of open cuts where two pipes are to be laid parallel in same trench or same pits, 30% of the respective SOR of the lower pipe size for the laid length shall be paid in additionally to the rates applicable to the higher pipe size.




Valves shall be installed at locations shown in the Design Plan or as directed by the EIC and joined with PE pipes by electro fusion techniques. The valves shall be placed on a concrete square block at the bottom to achieve equivalent support of the incoming and outgoing pipe work.

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

A pipe may pass through an open drain or nallah with prior approval from EIC. Where this is permitted, the PE pipe shall be installed inside a concrete or steel sleeve for protection with no cost implications to the owner. The sleeve material shall be procured and laid by the Contractor with prior inspection and approval of the EIC for the quality of material. In general, the GI Sleeve material specification shall be confirming to IS 1239 (Heavy Duty) specification of reputed make.

Contractor to ensure majority (up to 70% of the available potential) of service lines for connecting houses shall be laid at first instance of internal network laying, however any slippage / deviation shall be submitted with consents for approval from EIC/PMC

In case of service lines, EIC shall decide either half round concrete sleeve or GI pipe sleeve shall be installed at any particular site depending upon site condition. The half round concrete sleeve shall be preferred over GI Sleeve, however in case where the installation of half round Concrete Sleeve is not possible due to technical feasibility and site conditions, GI sleeves shall be installed only after written approval from EIC. The rate of GI Sleeve / half round concrete sleeve shall be included in laying of 20/32 mm dia., depending upon surface conditions. The details are mentioned below:

  	<p style="text-align: center;">PTS - LAYING OF MDPE MAIN PIPELINE AND SERVICE PIPELINE</p>	<p style="text-align: center;">P.014714 G 11031 041</p>
---	---	---

GI Sleeve:

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

The contractor shall supply the minimum dia. Size of 2.5" & 3", 300 mm in length, GI sleeves (Heavy Duty reputed make) respectively for domestic & commercial / industrial installations. The vertical portion of the sleeves shall be fixed to the wall of the premises in a secure manner. The material test certificates/ inspection reports shall be submitted at the time of submission of bill. The material shall be inspected by TPIA / PMC before installation.

Half Round Concrete Sleeve:

The installation of Half Round Concrete sleeve for service lines shall be done by sealing the annulus between pipe and sleeve, firm fixing of the Concrete sleeves by concrete mix pedestal, clamping, sand filling, etc. Half round concrete sleeve shall be made as per enclosed drawing in the tender. The dimensions shown are tentative and may vary depending upon the site conditions. The material shall be inspected by TPIA / PMC at the fabrication stage & prior to final dispatch at site for installation. The material test certificates/ inspection reports shall be submitted at the time of submission of bill.

16.0 JOINTING OF POLYETHYLENE PIPE

The procedure for jointing of PE pipes and fittings shall be as per applicable PTS which is part of this tender document. Only Bar coded electro-fusion machine (Automatically Readable) that can read the bar code of the fittings automatically shall be used for joining of the MDPE pipes/fittings. Manual feeding Electro-fusion machines are not acceptable for jointing purpose. **The contractor has to submit the certificate of calibration of Fusion machine at the time of start of work and at fixed intervals as per the instructions of Owner. Contractor shall ensure that the machines are always available at site. No stoppage of work due to the non availability of machines shall be allowed.**

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

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

The contractor has to supply all the consumables required for carrying fusion of the joints (like tissue paper, napkin, acetone etc.).

If, upon inspection, the EIC determines a joint is defective, Contractor shall remove the joint by an approved method. The cost of replacing joint shall be borne by the Contractor including the cost of pipe and fittings removed.

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

Only, approved Jointers shall carry out fusion of all joints. Contractors shall provide the list of jointers to be used on the job and make arrangements for Qualification Testing of the jointers in presence of Owner / Owner's representative as per the standard procedures. All approved Jointers shall bear identity cards signed by Owner / Owner's representative during fusion job and shall furnish the same on demand by Owner / Owner's representative.

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

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.

TRACTEBEL ENGINEERING PVT. LTD.

GURGAON OFFICE
Intec House, 37
Institutional Area, Sector 44
122002 - Gurgaon - INDIA
tractebel-engie.com

NITISH NANDI
tel. +91 124 469 8500
fax +91 124 469 8586
nitish.nandi@tractebel.engie.com

