used are inspected, certified by competent authority valid & suitable for use. Plumber deployed for riser installation for high rise buildings shall be certified and prequalified with medical tests as per Safety Job Procedure.

- **Meter & Meter Regulator Positions**

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

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

  Meter Regulators will be installed as per enclosed drawing 15792-20-05-07.

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

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

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

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

- **Installation of Meter**

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

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

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

  The Meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage

of gas. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

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

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

- **Laterals**

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

- **Ventilation**

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

- **Pipes Passing Through Walls**

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

a. The pipe must be sleeved in a continuous non corrosive sleeve. Joints or any other part of a joint shall not be enclosed within the sleeve.

b. Pre-sleeved wall pieces are the preferred method for passing through walls and floors.

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

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

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12.0 TESTING OF GI/COPPER INSTALLATION

- Only pretested riser shall be erected using pulley arrangement. Pretesting shall be done with compressed air at 2 bar (g) for minimum duration of 30minutes.
- Risers and laterals shall be Leak tested with compressed air at 2bar (g) for minimum 2hrs after vertical installation.
- Once testing is satisfactorily completed, uncoated portion (welded) of risers and laterals shall be painted as per painting procedure.

- The GI/Copper/MLC installation from lateral valve to appliance valve shall be tested at a pressure of 100 mbar (g) for a holding period of 15 minutes with no pressure drop. All the joints in the installation shall be checked with soap solution.
- The contractor shall supply the Calibrated Pressure Gauges / Manometer / Diaphragm Gauges of suitable range for testing of GI/Copper/MLC Installations ranging from 0-4bars / 0-500mbar respectively. The calibration certificate shall be submitted before the start of the execution work.
- The pressure gauges shall be calibrated from time-to-time as desired by EIC but positively once in every six months.
- The details of testing shall be properly recorded in the GI/Copper cards.

13.0 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.

14.0 PURGING & COMMISSIONING

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

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

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

15.0 RESTORATION

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

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

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

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

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

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

16.0 SUBMISSION OF FINAL RECORDS

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

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

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

Scope includes use of fall arrestor, Ascenders / descended, PPE, Barricades/ Warning Boards (03 No's) connected with warning board/Caution tapes (Refer drawing no. 15792-10-03-26 & 15792-10-03-32) in areas where piping work is in progress, Use of Safety shoes, Wacky talky, Hand gloves, Reflective jackets, Hard hats (helmets), eye and ear safety equipment, Fire extinguishers and as per the detailed scope of work in tender specifications. Contractor shall also prepare and submit duly certified Safety check list signed by TPIA/PMC. In case of non-compliance, penalty shall be applicable as per SCC clause.

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

ANNEXURE # 1

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

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

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

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION

FOR
INSTALLATION OF MRS & INTERNAL PIPING FOR COMMERCIAL & INDUSTRIAL CUSTOMERS
VCS – SS – PL – 0051

REV.	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.2018	ISSUED AS STANDARD	PK	MVK	AD

CONTENTS

1.0 GENERAL INFORMATION

Indraprastha Gas Ltd. is a Joint Venture Company of Gas Authority of India Ltd. (GAIL), Bharat Petroleum Corporation Ltd. (BPCL) and Govt. of NCT of Delhi. IGL plans to install an underground Natural Gas Distribution network throughout the NCT, NCR & Rewari Region. The objective is to supply Natural Gas to both DOMESTIC and COMMERCIAL customers, and to provide compressed gas as a fuel for Automobiles. IGL is seeking Contractors to assist in meeting the above objective.

The present document gives the specification to be adopted for procurement of CS pipes & fittings, fabrication, erection, installation, and commissioning of MRS (Meter Regulating Skid) along with internal piping (on request) on downstream of MRS to supply Natural Gas for commercial and industrial customers in NCT of Delhi and NCR complying with OISD standards & petroleum and Natural Gas Regularly Board (PNGRB) guidelines.

2.0 APPLICABLE CODES & STANDARDS

3.1 GENERAL

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

ASME STANDARDS

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

ASTM STANDARDS

ASTM A 53/A 53 M	Pipe steel black and hot dipped, Zinc-Coated, Welded and seamless
ASTM A 105/A 105 M	Forgings, Carbon steel, for piping components
ASTM A193/A 193 M	Alloy steel and stainless steel bolting materials for high temperature services.
ASTM A194/A194 M	Carbon and alloy steel nuts for bolts for high temperature Services
ASTM A234/A 234 M	Piping, fitting, of wrought carbon steel and alloy steel for

	moderate and elevated temperature
ASTM A 370	Mechanical testing of steel product
ASTM A 515	Pressure vessel plate, carbon steel for intermediate and higher temperature services
ASTM A 516	Pressure vessel plate, carbon steel for intermediate and higher temperature services
ASTM A 707/A 707 M	Flanges, forged, carbon and alloy steel for low temperature Service

API STANDARDS

API 5L	Specification for line pipe
API 1104	Specification for welding pipeline and related facilities
API 6D	Specification for pipeline valves (Ball, Gate, Plug Ball and Check Valves)
API 6 FA (Spec 6 FA)	Specification for fire Test for valves
BS 5351	Specification of small size valves (Below 2")

ISO STANDARDS

ISO 148	Determine the impact strength of steel and energy absorbed by charpy.
ISO 9001	Quality Management Standards

OIL INDUSTRY SAFETY DIRECTORATE (OISD STANDARDS)

OISD-GGN-115	Guidelines on fire fighting, Equipment and appliances in Petroleum industry
OISD-standard-113	Hazardous area classification
OISD-Standard-163	Process Control Room Safety

In case of contradiction, the most stringent will apply

3.0 SYSTEM OF UNITS

The international system of Units (SI), also known as the "Metric system" shall be used.

The international Gas union (IGU) has also recommended, generalizing the use of the SI system in all matters relating to Gas and Gas facilities.