

PETROLEUM AND NATURAL GAS REGULATORY BOARD

New Delhi, the....

1. Short title and commencement.

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2. Definitions

(1) In these guidelines, unless the context otherwise requires,-

- “Act” means The Petroleum and Natural Gas Regulatory Board Act, 2006
- “Engineer In-charge or responsible engineer” means the qualified engineer appointed by CGD entity who will be responsible for the application of all or part of these guidelines;
- “MRS” means Metering and regulating station used for pressure controlling and metering of natural gas at customer’s premises with or without pressure regulation.
- “Internal Piping (IP)” means the section of pipeline installed fabricated from the outlet flange of MRS, up to appliances point.
- “Commissioning” means safe introduction of natural gas into the internal pipeline.
- “Authorized Personnel” means a competent person of the agency authorized by CGD or PNGRB who is deployed or assigned to carry out a specific job for conducting inspection and testing of the installation in line with these guidelines.

(2) Words and expressions used and not defined in these guidelines, but defined in the Act or in the rules or regulations made thereunder, shall have the meanings respectively assigned to them in the Act or in the rules or regulations, as the case may be.

3. Applicability

- (1) These guidelines shall apply to the industrial and commercial customers connected by CGD entity with the city or local natural gas distribution networks as well as customers consuming natural gas other than for domestic use and categorized under non-domestic segment except in transport for automotive use.
- (2) These guidelines cover the general recommendation for material selection, safe installation, inspection / testing to be carried out prior to commissioning of the facilities at the downstream of MRS upto appliance point for new as well as for the cases where alterations are required;
- (3) This guideline should not be applied retrospectively to such aspect of existing installations. However, the reference to this guideline should be taken for all future alteration and modification in existing PNG installation as appropriate deemed fit by CGD entity.
- (4) The customer shall ensure compliance to this guideline for the health, safety and integrity of the IP downstream of meter or MRS as well as appliances or equipment throughout the operating period.
- (5) A certificate from PNGRB approved third party agency certifying that material selection, planning & designing, installation, inspection, testing and commissioning as well as health assessment of the

facilities downstream of Meter or MRS shall be obtained by customer & retained. List of Approved PNGRB Agencies shall be available in website of PNGRB (www.pngrb.gov.in).

- (6) The customer to ensure that any alteration in IP line or any addition or reduction of equipment post gas-in shall be done after approval from CGD entity or PNGRB authorized third party inspection agencies with intimation to CGD entity.
- (7) Wherever underground PE pipeline is laid, PNGRB T4S for CGD network standard shall be referred.

4. Intent

The guideline is intended for ensuring the health, safety and integrity of internal installation within the customer premises including and not limited to its material selection, planning & designing, installation, inspection, testing and commissioning as well as operation and maintenance of the facilities downstream of Meter or MRS conforming to specifications laid down in the PNGRB Technical Standards for CGD Networks (T4S).

5. Route Selection

In case gas burners are to be connected directly to the regulator supplied by the authorized entity, the line size to be designed in such a way that adequate pressure is available at burners inlet when all burners (existing as well as proposed) are running on full load capacity.

The meter and regulator or MRS shall be installed at the entry of the premise.

In case a separate regulator(s) is/are to be installed before burners then pressure at the farthest point (before the regulator) should not be less than minimum inlet pressure required at the regulator inlet.

The route is selected by the customer in such manner that it should not create unsafe condition for new installation as well as alteration cases.

The route shall be chosen in such a way that oil stains, hot applications, electrical appliances, electrical cables, AC Outdoor units etc. are at safe distance from gas line path.

Customer has to ensure that IP is not used for any purposes which can compromise the safety and integrity of installation.

Due care should be taken during planning stage to accommodate additional equipment or burners adjoining to existing facility without compromising safety and integrity of installations.

The IP line should be installed aboveground due to reasons attributed to the safety, integrity, ease in inspection, O&M and to avoid corrosion.

Saferoute should be selected from where firm structure is available. The structural stability to be ensured by customer prior to installation and ensure fit for intended use.

Safe distance should be maintained from utilities like steam line, oil line & electric HT line, hotzones,etc.

Passing of IP line should be avoided through less or non-ventilated areas, temporary structure, drain ducts.

Installation of pipeline should be avoided at heights where the construction and subsequent inspection of PNG piping becomes unsafe.

Wherever, adequate ventilation is not available at critical public places, customer should carry out risk assessment and implement mitigation measures (one or more of the followings) reduce the risk to ALARP and Onus of operation and maintenance of the same shall remain with customer.

- Ventilator
- Increase inspection frequency
- PNG Gas detection system
- Solenoid and shut off valve
- Any other means to reduce the risk

6. Materials Selection

All materials and equipment forming a permanent part of the IP system shall be constructed according to this guideline and should be qualified for the conditions in which it is to be used. The materials should be conforming, but not limited to, the standards and specification mentioned in Annexure 1.

7. Installations

The installation of IP line shall be ensured as per PNGRB T4S regulations for CGD networks.

- All welding should be carried out by qualified welder as per API 1104.
- Teflon tape should be used for threaded joints. Any sealant agents or chemicals like M-seal, fevikwik, etc. are not permitted.
- Wherever gas pipeline crosses over other pipes and electric cables/electric points necessary measures to be taken to safe guard the gas line. For pipes passing through walls, sealing should be sleeved and filled with cementing.
- Flanged joints should not be provided within 300 mm distance of electrical points or junction points. However, the service line installed in confined spaces like basement, etc. shall be of welded type only.
- All pipe work should be horizontally and vertically aligned.
- Pipe should be firmly tightened on support with U bolts or clamps, having adequate strength to hold the piping system.
- Adequate clamps / pipe supports on the piping system shall be provided such that the safety and integrity of PNG installation is maintained.
- Pipe support or clamps should be firmly fixed on wall or structure. A safe gap of 1" should be maintained between pipe and wall.
- Provide rubber sheet between pipe and support to protect pipe from corrosion. Provide PVC coated "U" clamp to support the pipe of size 2" and higher.
- Pipe support should not be mounted on temporary wall/temporary shed/trees / glass or wooden facades, etc.
- In case provision is made by customer to have alternate fuel source during natural gas supply disruption, then the customer should ensure that both the fuels shall not be used at a time

using same IP line (i.e. both the fuel should not be mixed).The customer should get the “Changeover operation methodology” and customized site specific P&ID approved by CGD entity or PNGRB authorized TPA.

- In case of IP modification or alteration after gas commissioning, the entire pipeline is to be isolated, purged using nitrogen prior to carry out any welding operation.
- Flanges joint should have nuts/stud bolts. The extra length stud bolts to be used such that at least 3 pitches are visible on both sides after placement of washers. All stud bolts and nuts should be galvanized as per ASTM A153.

8. Corrosion protection and Markings

- Pipes / fittings / valves / supports & other equipment shall be painted.
- Special care should be taken to ensure uniform painting thickness throughout entire pipework.
- Direction of gas flow and PNG should be marked along the natural gas pipeline.
- Self-adhesive anti-corrosion tapes or PE sleeve while crossing of walls or slabs or corrosion prone area to protect the pipe from corrosion.

9. Inspection and Testing

- Entire pipe work should be flushed with nitrogen / air to remove spoils, dust, dirt, welding spatter etc. Meter and regulator should be removed before flushing to avoid any potential damage. Flushing should be done from each end point.
- After flushing, the entire pipework should be pneumatically tested, after removing meter and regulators, as per T4S for CGD networks.
- Testing should be done with all appliances valves open and plugged. Each joint, specifically threaded joints should be checked with leak detection method. All necessary precautionary measures should be taken during testing.
- For IP operating at MOP upto 4 bar, the testing shall be done with 1.5 times design pressure and pressure holding period shall be minimum 60 min.
- After successfully completion of testing, the pressure should be vented out safely, meter and regulators may be kept in place. The testing certificate should be produced and signed by Contractor and Authorized personnel of approved third party inspection agency as per the proforma. (Annexure 2 to be filled by TPIA).
- If pressure in Meter or MRS downstream pipeline is operating at the pressure 4 barg or above, Nondestructive examination and soundness testing should be carried out as per T4S for CGD network regulation. All defects identified during NDE shall be repaired.
- For IP operating at MOP upto 4 bar, all welded/ threaded joints are inspected and defects are repaired prior to commissioning.
- The leak survey should be carried out annually to ensure safe control of operation by customer.
- All the pressure tests conducted at every three years shall be witnessed by authorized personnel of approved TPA issuing a certificate for being fit for use (Annexure 2). The fit for use certificate shall be submitted to Engineer In-charge of CGD entity for their records and prior to commissioning.

10. Commissioning

Before start of commissioning works, all the relevant details of pre commissioning checks, safety

audits including inspection and testing are to be recorded by TPA in check list attached in **Annexure 3** (to be submitted by TPA on its letter head & signed by customer), so as to ensure that operations are carried out in a safe manner.

After completion of the pre-commissioning checks, the pipeline network is considered to be ready for the commissioning.

The relevant records and documents should be made available prior to commissioning, i.e., material test reports, testing reports, equipment test & calibration reports, drawings, etc.

Internal pipeline checks

- Remove blind spade from downstream of isolation valve
- Keep the vent valve in the farthest end in open condition.
- Ensure no open flame and other flammable material is available near the venting area.
- Commission IP line by gradually opening of isolation valve and ensure more than 90% CH₄ by safe venting of natural gas at farthest vent point.

11. Safety Measures

Adequate No. of safety gadgets, personal protective equipment, emergency handling facilities, sign boards, Do's and Don'ts, etc. as required during the installation, testing and commissioning should be in place and available at designated place. The following should be ensured at sites.

- The work area has been cordoned off and required displays are provided.
- A minimum of one (1) dry powder type extinguishers (9 kg) should be available at the time of purging / venting / commissioning activities.
- Smoking, naked light or other sources of ignition should be prohibited. Warning signage/ pictograms like "NO SMOKING" and "NO NAKED LIGHTS" should be prominently displayed around the work site, including vent points during purging and commissioning.
- Signage covering Emergency contact number of entity to be affixed on Meter or MRS .
- Electrical continuity bonds (copper jumpers) are fitted across separated metallic pipes prior to purging operation.
- It should be emphasized that purged gas other than air is potentially dangerous for asphyxiation and information to prevent asphyxiation should be provided in procedure.
- Proper housekeeping shall be maintained by customer around MRS or metering areas.
- In any case, no hazardous or inflammable materials shall be placed in vicinity of PNG installation.
- All installations must have displayed the Dos and DON'Ts based on those provided by CGD entity.

The entity reserves right to discontinue gas supply to customer in the event on any non-compliances or unsafe installation or unsafe practices observed by CGD entity at any point of time during and after commissioning.

12. Enclosure

- a. Annexure 1: Material Standards and specifications
- b. Annexure 2: Fit for use certificate
- c. Annexure 3: Check list

Annexure 1

Material Standards and Specifications

Sr. No.	Item	Material Type	Specification
1	Steel pipe / Galvanized pipe	Mild steel (M.S.) or Carbon Steel (C.S)	ERW GI pipes (Class C) as per IS 1239 Part 1 standard or API 5L Gr. B or ASTM A106 or ASTM A333
2	PE pipes and fittings and valves (underground)	Polyethylene	PE100/ PE80 grade, as per IS ISO 4437-2, ISO 4437-3 and ISO 4437-4 standards
2	Isolation Valve	Brass/Carbon Steel (C.S)	Upto and including 2": EN 331 More than 2": API 6D
3	Galvanized Fittings	GI Fittings, Mild steel (M.S.) or Carbon Steel (C.S)	IS 1239 (Part-2); IS 1879, ASME B16.9, ASME B16.11, ASTM A234
4	Galvanized Flanges (forged)	Carbon Steel	SORF, 150#, ASME B 16.5, Material as per ASTM A 105 hot dip galvanized
5	Socket weld end fittings	CS Forged, Socket Welding fitting,	ASTM A 234 WPB, Dimensions as per ANSI B16.11, hot dip galvanized
6	PE fittings	Electrofusion Fitting	ISO 4437-3
7	Flexible Hose	Stainless Steel(S.S.) 316L	SS braided bellow pipe
8	Gasket	CNAF- Spiral wound or non-metallic flat	ASME B16.20/ASME B16.21
9	Galvanized Fasteners	steel	ASTM A193 /A 194 Grade B7 /2 H
10	Galvanizing	Hot dip Zinc coating	IS 4736
11	"U" clamp	GI Coated and PVC sleeve	1"to 4"
12	Welding Electrodes		AWS E 6010 & E6013
13	Stud bolt, Nut	Galvanized	Stud - ASTM A 193 GrB7 Nut – ASTM A 194
14	Filter	Stainless steel	50 micron mesh and forged body. Internal SS 316 & External ASTM A 106.
15	Self-adhesive Anti corrosive Tape for wall crossing	300 micron, 2.5 cm or 5 cm (1" or 2")	As approved by CGD entity

Annexure 2

Fit for Use Certificate

(To be issued by TPA)

Date:

To,

<Name of authorized entity>

<Address >

**Subject: Fit for Use Certificate for Internal pipeline & gas installation
Customer no- _____**

Respected Sir/ Madam,

We have ~~completed~~ inspected and tested the installation / modification of ~~our~~ complete internal gas pipeline (IP) / gas installation from *<Name of the Contractor>*.

The entire gas pipeline (IP) has been tested at _____ bar(g) pressure for _____ hours. The testing was satisfactory and no leakage was found.

The customer have used all materials and followed the construction procedure as mentioned in specification of authorized entity's guidelines.

~~Our~~The internal pipes (IP) and equipment are inspected, tested, and are safe and Fit for Use to receive natural gas.

We hereby reconfirm that this connection is ready for commissioning & is suitable in all ways for using the safe PNG gas supply.

Regards,

<Name and sign of the authorized person>

<Seal of the Company>

Annexure 3

Check list (for issuance of Fit for Use Certificate)

(To be submitted by TPIA on letter head and signed by PNG customer)

Date:

Customer Number:

Customer Name:

Address:

Date of Inspection:

Name of CGD Entity:

Name of Contractor:

Name of TPIA

Name of Authorized personal:

Sr. No.	Checklist Items	Yes	No	Remarks
A	Route Selection			
1	Pipe route, which is indicated by the authorized personnel, is followed	<input type="checkbox"/>	<input type="checkbox"/>	
2	Whether the pipeline route selected for IP is safe.	<input type="checkbox"/>	<input type="checkbox"/>	
B	Materials			
1	All materials and equipment use in piping system are complied with PNGRB guidelines and relevant regulations.	<input type="checkbox"/>	<input type="checkbox"/>	
C	Internal Piping			
1	All welding are carried out as per API 1104.	<input type="checkbox"/>	<input type="checkbox"/>	
2	Teflon tape is used for threaded joints.			
3	PVC sleeve is provided wherever distance between pipe and electric cables/electric points is less than 300 mm			
4	Flanged joints isnot provided within 300 mm radial distance of electrical points or junction points.			

6	Sufficient permanent support provided for Internal piping.	<input type="checkbox"/>	<input type="checkbox"/>	
7	Pipe support or clamps should be firmly fixed on wall with U bolt or clamps.	<input type="checkbox"/>	<input type="checkbox"/>	
9	The steel pipeline is not laid across or below the electrical lines.	<input type="checkbox"/>	<input type="checkbox"/>	
D	Corrosion protection and Markings			
1	Pipes / fittings / valves / supports & other equipment are painted as per guideline	<input type="checkbox"/>	<input type="checkbox"/>	
2	Direction of gas flow and PNG are marked along the PNG pipeline.	<input type="checkbox"/>	<input type="checkbox"/>	
3	Provide self-adhesive anti-corrosion tapes or PE sleeve while crossing of walls or slabs or other corrosion prone area to protect the pipe from corrosion.	<input type="checkbox"/>	<input type="checkbox"/>	
E	Inspection and Testing			
1	Inspection and testing is carried out as per approved procedure.	<input type="checkbox"/>	<input type="checkbox"/>	
2	The pneumatic test is carried out as per approved procedure.	<input type="checkbox"/>	<input type="checkbox"/>	
3	The testing certificate is produced and signed by Contractor and Authorized personnel of approved TPA as per the proforma. (Annexure 2)	<input type="checkbox"/>	<input type="checkbox"/>	
4	For IP operating at the pressure 4 bar or above, 10 % nondestructive examination is carried out and defects are repaired.	<input type="checkbox"/>	<input type="checkbox"/>	
F	Records			

Remarks:

1. _____
2. _____

Certificate

We hereby certify that the pipeline installation/ laying work have been carried out in accordance with guidelines, specification, approved work procedures including inspection & testing and the installation is found satisfactory and fit for use or / and ready for commissioning.

Issued by:

Third party Inspection agency Sign and Stamp:	
Date & Time:	

We hereby confirm that any responsibility beyond the delivery point lies with us in line with the Gas Sales Agreement.

Regards,

<Name and sign of the authorized person>
<Seal of the Company>