

Guidelines on installation of Instantaneous water heaters (Gas Geysers) with natural gas for domestic use

1. Introduction

This section has been prepared to provide guidelines for installation of copper pipe work and associated equipment inside domestic premises for supply of natural gas to instantaneous water heaters (gas geysers), of nominal heat input not exceeding 25 kW and operating at pressure up to 21 mbar (g). The installation inside the property (or kitchen) comprises copper tubing, appliance valve, steel reinforced rubber tube & geyser commissioning.

2. Definitions

- Installation pipes - Pipe work of copper tube constructed between Tee connection (on downstream of diaphragm gas meter) and Appliance Valve (AV) installed near gas geyser.
- Meter Control Valve (MCV) - A MCV is fitted immediately upstream of the gas meter to enable isolation of the internal pipe work inside the property from the upstream gas supply network.
- Geyser Isolation Valve – A MCV fitted downstream of Tee connection to isolate supply of gas to Gas Geyser.
- Appliance Valve (AV) - A valve fitted downstream of gas meter and upstream & adjacent to an appliance, to shut off the supply of gas to it.

3. Instantaneous Water Heaters (Gas Geyser) Installation requirements & information:

3.1 Model of Gas Geyser:

The Gas geyser shall be manufactured and tested in accordance with all the requirements of valid editions of IS 17150 and / or BS EN 26 standards, and the manufacturer should possess valid BIS license for geysers manufactured in accordance with IS 17150 standards.

- Customer can purchase any **BIS approved** gas geyser of any model / brand from Original Equipment Manufacturer (OEM) or their authorized distributor.
- Maximum capacity of Gas geyser shall be 10 liters of water per minute and operating at normal working pressure of 21 mbar (g).

3.2 Gas Geyser shall have the following safety features (As a minimum)

- a. **Flame Failure Shut Off Device:** The appliance shall have a flame failure device, controlling the admission of gas to the main burner and possibly to any ignition pilot, in case flame is extinguished.
- b. **Over-heat Protection Device:** The water heater shall have a suitable overheat protection device, which shall switch off the supply of gas if the temperature of the delivered water reaches 95 °C. The gas supply shall be restored manually.
- c. **Gas and Water Stability Device:** The appliance shall operate with tap fully open at gas inlet pressure of 21 mbar (g) without the flame extinguishing, blowing off or striking back and without the formation of soot.
- d. **Oxygen Depletion Sensor / Incomplete Combustion Safety Device:** The appliance shall have Sensor which can detect Oxygen and / or Carbon Monoxide (CO) at the same time.

3.3 Gas geysers Location:

- Gas Geysers shall only be installed in areas like,
 - Kitchens, living rooms, Utility Rooms, Halls and Passageways if flueing and ventilation can be achieved.
 - Bedrooms / bed-sitting rooms provided room volume is greater than 20 cubic meters and ventilation requirements are fulfilled.
 - Gas Geyser should be installed at such a height that it can be switched off easily.No Gas Geyser is permitted to be concealed.

Installation and connection of water pipeline to the geyser need also to be planned by customer while deciding location of geyser.

Warning: Geyser shall be installed in a proper ventilated area only and shall not be installed inside the bathroom

Gas Geysers shall be installed through recommended service providers and list of such contractors are given on MGL web site under customer zone/Aftersales contractor list.

3.4 Ventilation requirement:

- Gas geyser shall be installed in an area with adequate ventilation. As a guide, a minimum ventilation area of 4% of the internal floor area of the room must be provided in the room where geyser is located. The gaps under and around door, windows and ventilators provide adequate ventilation to the rooms of normally occupied individual domestic dwellings.

3.5 Advantages of installing Geyser in Kitchen:

- a. Safe, as chances of asphyxiation due to emission of fumes inside the bathroom is eliminated.
- b. Hot water will be available in the Kitchen pipe for washing oily kitchen utensils.
- c. The length of copper tubing will be minimum as the connection will be provided from PNG installation in kitchen.

3.6 Dangers of installing Geyser in Bathroom are:

- a. Greater chances of accumulation of fumes inside the bathroom, which can lead to Suffocation / asphyxiation.
- b. It is not recommended to run gas pipe across the length of the house as any leak from joints will be dangerous.

4. Safety Requirements

- Conduct hazard identification & risk assessment before start of activity.
- Use personal protective equipment.
- Ensure isolation of gas supply & purge out the residue gas outside kitchen before carrying out work.
- Ensure safety compliance while executing work.
- Ensure no gas leak exists in the premises before leaving the site.

5. Technical guidelines:

5.1 Size of copper tube

- As a standard practice, seamless round Copper tube half hard having outside diameter of 12 mm & wall thickness of 0.6 mm shall be used, where cooking appliance having maximum of four burners and an instantaneous water heater is employed.

5.2 Material

- Copper pipe complying with BS EN 1057.
- Pre-soldered copper Fittings for use in joining 12 mm copper tube shall be as per BS EN 1254 Part 1 and material shall be as per to BS EN 1057.

- Steel reinforced rubber hose of size 8 mm NB complying to IS 9573 Part 2 shall be used. The length of the rubber hose shall not be more than length of 1.5 meters. Rubber hose shall have marking of month & year of manufacture.
- Filler metals in solder joint shall be of 3.25 mm (10 SWG) diameter, Lead free, Group Tin-Copper with alloy designation Sn99.3Cu 0.7 - as per BS EN ISO 9453.

5.3 Copper pipe Installation

- Copper pipes for Geyser installation MUST not run on outside wall of building.
- Copper pipes shall be adequately supported at a max. distance of 0.5 meters by using PVC clamps suitable for 12mm copper pipe.
- Installation pipe work should be installed at least 300 mm away from electricity meters and associated electric switches / fuse boxes, and at least 25 mm away from the electricity supply and distribution cables. Where these special requirements are impractical, suitable electrically insulating tape should be wrapped around the pipe.
- Care shall be taken to prevent the ingress of dirt and water etc. into installation piping.

5.4 Geyser Isolation Valve

- Geyser Isolation Valve must be fitted immediately after Tee connection on downstream copper pipe, along with associated brass fittings.
- Marked to show the open and closed positions
- To be Fitted in accessible & easy to operate position

5.5 Appliance Valve (AV)

AV shall be fitted at an easily accessible location. One end of the AV shall be fitted with a brass fitting (which will be soldered with copper tube) and other end shall be fitted with steel reinforced rubber hose.

5.6 Steel Reinforced Rubber Hose

- It is connected between Appliance valve and Gas geyser. The rubber hose shall not be exposed to hot elements.
- Length of flexible hose shall be kept minimum. In no case the length shall be more than 1.5 meter and the installation shall be such that there is no hanging / sagging of the rubber hose.
- Both ends of the hose shall be firmly clamped on the nozzle by metallic worm drive hose clamps.

5.7 Solder Joint

- Flux should be non-acidic, Lead free and as per ASTM B 828 Standard or Equivalent
- Flux should be in the form of paste and packed in small tin containers of 500 grams & should have compatibility to use with solder wire (Lead free & as per BS EN ISO 9453) or Equivalent.
- Flux used to make capillary joints should only be active during the heating process. After the joint has been made, any remaining flux shall be removed.
- It is known that fluxed, unsoldered joints may satisfy the soundness test; therefore, finished joints shall always be visually examined to confirm that the solder has run.
- Good quality soldering should be done on copper pipe using blow lamp with appropriate usage of solder wire & flux. The pipe ends to be cut square and cleaned properly to ensure adequate joint strength.

5.8 Threaded Joint

- When making screwed joints, all threads must be clean. Hemp shall not be used on any threaded joints. PTFE (Teflon) tape shall be used, and it shall be wound with a 50% overlap.

5.9 Use of Blow Lamp

- When using a blow lamp on pipe work that contains gas, it is essential that the gas supply to that part of the pipe work has been isolated and disconnected and purged.
- Before commencing to use a blow lamp, ensure that the area has been adequately ventilated, particularly where gas could have accumulated in that area.
- When using a blow lamp or power tool in the vicinity of combustible material, due care shall be taken to avoid a fire hazard.
- For soldering work, butane gas cartridge used in blow lamp shall comply with EN 417. Electrically operated soldering devices as per IS standard may also be used.

5.10 Soundness Testing & Purging

- Upon completion and prior to gas being charged, the installation shall be tested with air to a pressure of 32 mbar for a period of 3 minutes after allowing 2 minutes for stabilization.
- Following the successful testing of the installation, purging shall be carried out from appliance valve for geyser. The purge shall be deemed completed when a crisp light blue stable flame is present.