



Increased Pressure Installation (IPI) Systems

This bulletin is intended to provide guidance for gasfitters regarding some domestic natural gas installations that may not comply with any (past or current) codes of practice or meet specific approval requirements. It provides information (especially for more recently qualified gas fitters) on how to recognise these installations and the actions that should be taken if you come across one when carrying out gasfitting work such as maintenance or adding a new appliance.

This bulletin is also intended, with your assistance, to seek further information to assess the level of gas installations that do not meet the requirements.

Note: Commercial and industrial installations specifically designed to operate at pressures higher than 7 kPa are not affected by this notice.



IPI system near gas meter

Introduction

Most domestic natural gas installations comprise conventional branched copper or galvanised pipework systems that run from the meter to all of the appliances and operate at pressures less than 7 kPa (and generally between 1 and 3 kPa) as shown in figure 1.

In 1987, special approval was given to install an alternative domestic piping system using small-bore (8mm outside diameter) pipe operating at 35 kPa - known as Flexigas or Increased Pressure Installation (IPI). These installations typically have individual pipes, without any joints, running from a manifold at the meter to each appliance's secondary regulator. In addition to the different pipework configuration, the installation also has an additional secondary regulator fitted on the inlet pipework to each appliance. Approval to install this type of piping system was withdrawn in 1991, following two instances in which rodents chewed through the nylon tube.

Recently, a number of non-compliant installations mixing the two types of system have been found. This bulletin will help you to recognise them and modify them to make them compliant.

For further information contact:

Energy Safety Service
33 Bowen Street
PO Box 1473 Wellington New Zealand
Tel +64-4-472 0030 Fax +64-4-460 1365
Industry free-fax: 0508 SAFE ENERGY
(0508 72 33 36)

Web site: www.ess.govt.nz

Email: info@ess.govt.nz



IPI systems features

The specific features of an IPI installation are:

- The working pressure of the gas pipework measured at the outlet of the gas measurement set (GMS) will be well above normal - around 35 kPa - and the regulator at the GMS will probably be painted yellow.
- The pipes from the manifold will be either yellow nylon or copper, no larger than 8 mm outside diameter (OD).
- A secondary or additional non-relieving regulator will normally be fitted under or adjacent to each appliance to reduce the pressure down to a normal appliance inlet level.

A typical IPI installation is shown in Figure 2.

In some IPI installations, conventional low-pressure

pipework was also connected to the IPI manifold, as permitted in the IPI system interim specification. These low-pressure sections may have been added after the initial IPI system was installed. The installations have the same specific features as the standard IPI systems, but the conventional part of the pipework operates on low pressure (LP) (below 7 kPa), through an additional secondary regulator (with relief valve) at the manifold. A branched layout with a number of tees and bends and other joints between the GMS and the appliances was permitted in this LP section.

A typical mixed IPI/LP installation is shown in Figure 3.

Safety review

A number of surveys of the IPI systems have been carried out recently. These indicate that most IPI

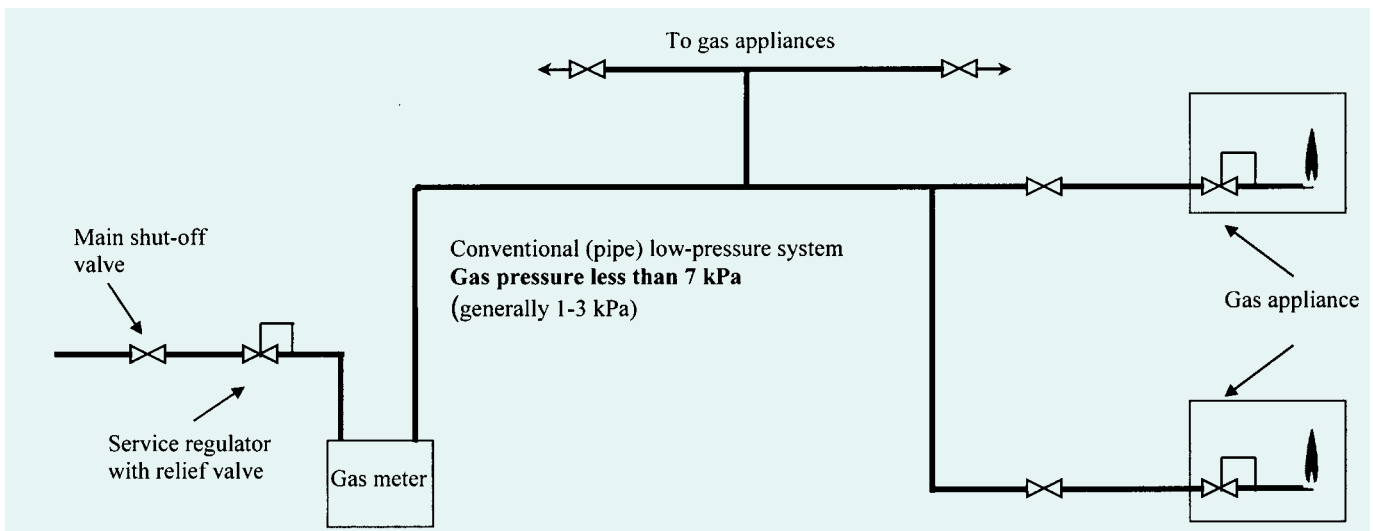


Fig 1: Typical (conventional) installation under current code

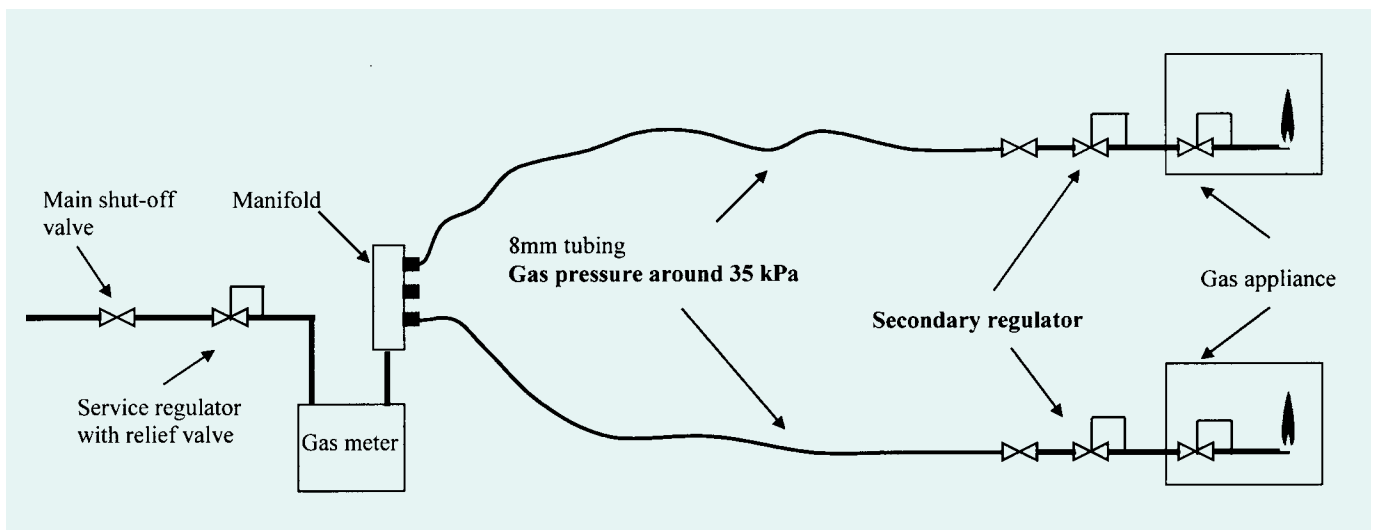


Fig 2: Acceptable IPI installation under IPI interim specifications (1987)

systems sampled continue to function satisfactorily. Records show that approximately 4,000 IPI installations were originally installed before approval was withdrawn. Many of these installations remain in service but some have subsequently been modified to conventional low-pressure systems or to a mix of LP and IPI systems, that are deemed compliant.

However, during the surveys, a particular hybrid pipework configuration that does not comply with the approvals for the IPI system was found. Instead of an individual small bore pipe running from the manifold to each appliance, some installations consist of a branched pipework system using 15 mm and 20 mm pipes working at 35 kPa, with no separate regulator at the manifold to reduce the pressure below 7 kPa. This combination of pipework diameter, layout, and working pressure defeats two of the safety features of the IPI small bore pipework concept that

the leakage rate from any rupture to the pipework is limited by the small bore of the pipes and that there are no pipe joints between the manifold and the appliance. **THESE INSTALLATIONS ARE NON-COMPLIANT AND MUST BE MODIFIED.** See the section on “What to do if you find a non-compliant installation”

How to recognise a hybrid non-compliant installation

The specific features of this type of installation are:

- All or some of the pipework is sized 15 and/or 20 mm diameter, and
- all or some of the pipework sized 15 mm and/or 20 mm diameter operates at an elevated pressure (well above 7 kPa), and
- the pipework layout will most likely have a branched layout with a number of tees and bends

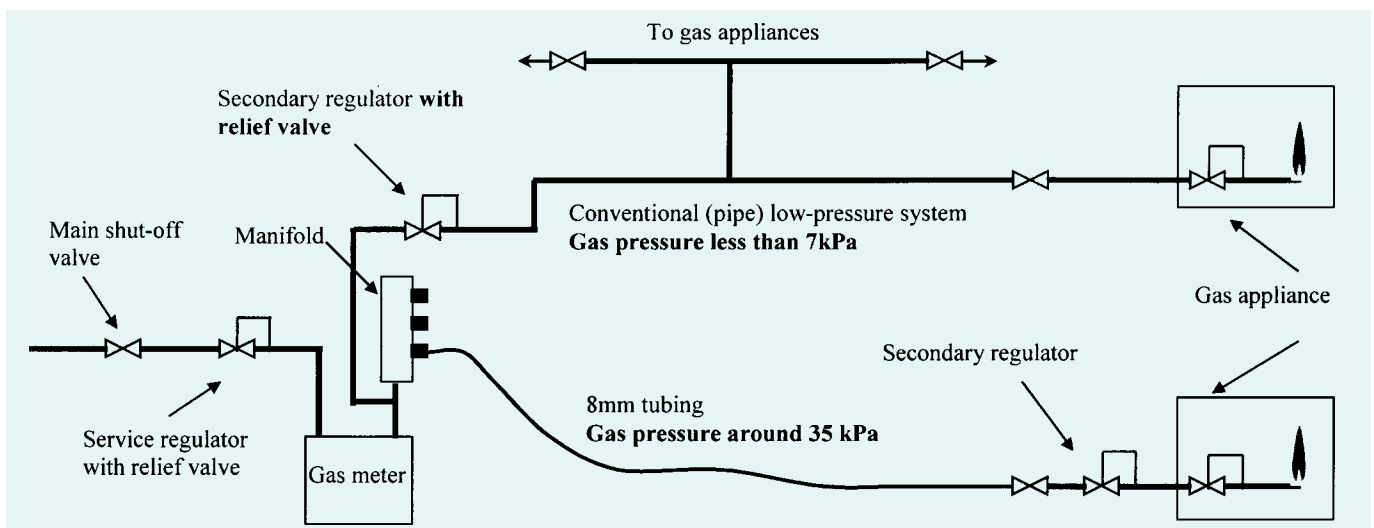


Fig 3: Acceptable mixed IPI/LP installation under IPI interim specifications (1987)

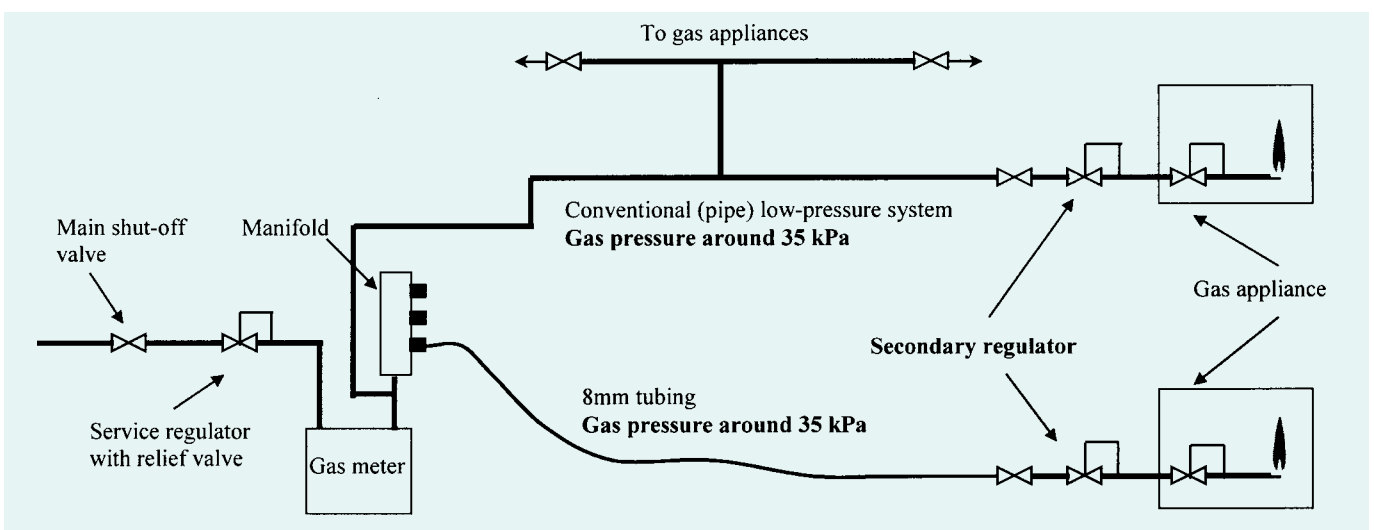


Fig 4: Non-compliant installation under IPI interim specifications (1987)

and other joints between the GMS and the appliances.

In addition, there will probably be additional regulators fitted under or adjacent to each appliance to reduce the pressure down to the normal LP appliance inlet level.

A typical hybrid non-compliant installation is shown in Figure 4.

If a hybrid system like the above non-compliant installation is found, it **MUST BE MODIFIED**. See the section on “What to do if you find a non-compliant installation”

Other non-compliant installations

In some IPI installations, the small diameter pipes may be branched or have joints at points other than at

the manifold and at the secondary regulator as shown in Fig 5. These installations are also non-compliant and **MUST BE MODIFIED**.

Conventional domestic type installations supplied at gas pressures greater than 7 kPa with non-relieving secondary regulators (mainly after converting from IPI) as shown in figure 6 are also non compliant and **MUST BE MODIFIED**.

What to do if you find a non-compliant installation:

- Advise the consumer of the need to modify the installation.
- Decide which sections of the installation must be converted to low- pressure operation.
- Review the pipe sizing of the installation to ensure

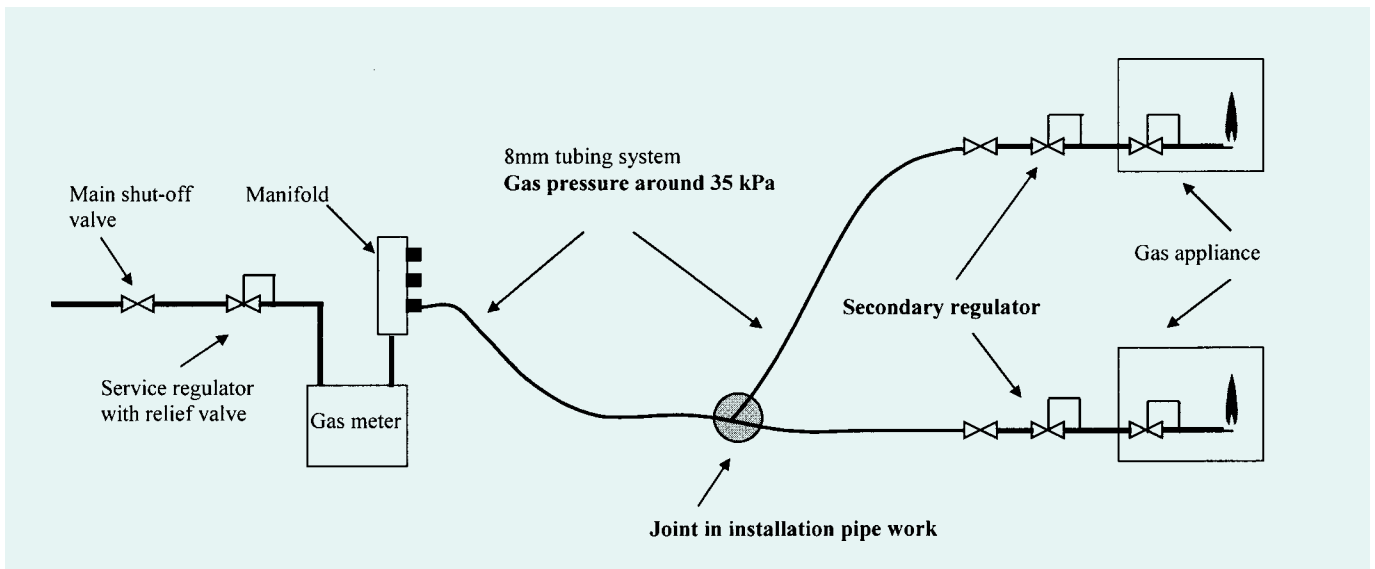


Fig 5: Non-compliant (and unsafe) branched installation under IPI interim specifications (1987)

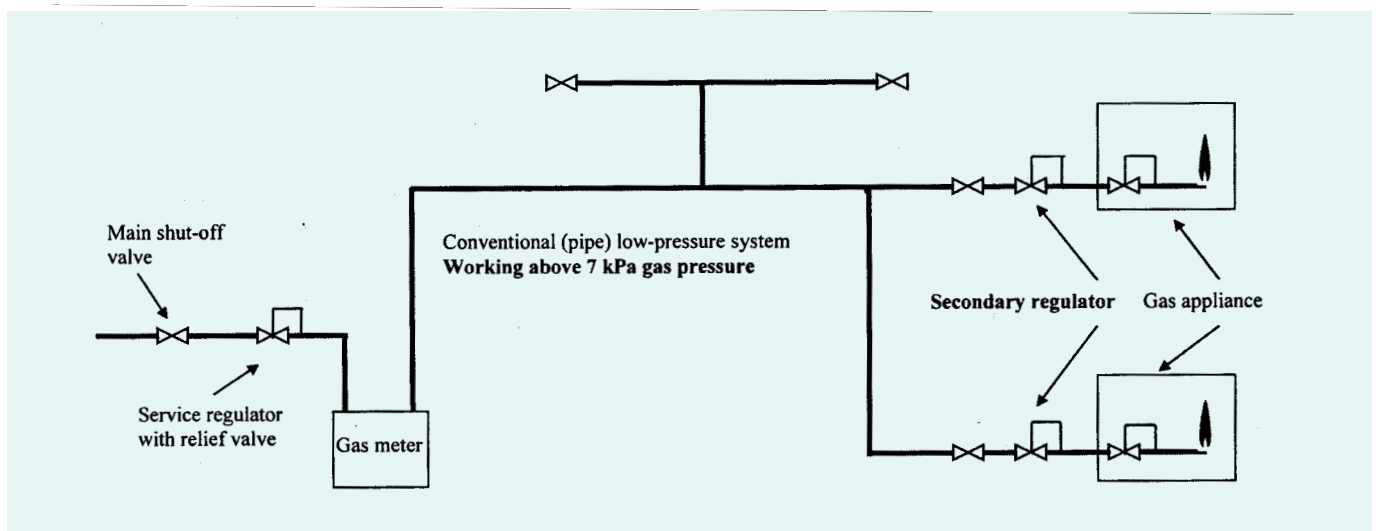


Fig 6: Non-compliant (and unsafe) conventional installation under current code

that it can handle the appliance flows at this reduced pressure (generally between 1 and 3 kPa).

- If all of the installation is to be converted to low pressure (as shown in figure 1), contact the gas supplier/GMS owner. Request that the Service Regulator be changed to reduce the metering pressure to the normal level for domestic natural gas (less than 7 kPa) and the meter factor amended.
- If only part of the installation is to be converted to low-pressure operation, install a suitable regulator with overpressure protection to reduce the pressure at the manifold as shown in figure 3.
- When the Service Regulator has been changed or the additional regulator installed, remove the secondary regulators on the downstream pipework to each appliance affected. (The appliance regulators must remain in place.)
- Replace any pipework that needs to be upsized.
- Carry out a pipework pressure test with the appliances isolated.
- Carry out an installation pressure test with all appliances connected.
- Check and adjust the working pressure of all appliances, as they may need to be reset due to the changed working conditions.
- Complete any other commissioning work and safety checksheet for the rest of the IPI system (see Checksheet for IPI system over the page).
- Complete and forward the Gasfitting Certification Certificate and the checksheet to the Plumbers, Gasfitters and Drainlayers Board. Also copy the Certificate to the gas supplier and the consumer in the normal manner.

What to do if you are modifying or extending an existing IPI system

Any modifications or additions to an IPI system should be made using conventional low-pressure techniques starting from the gas meter or manifold. Then complete any other commissioning work, the safety checksheet for the rest of the IPI system (see Safety checks for IPI systems), and the Gasfitting Certification Certificate for the installation. Please inform the Energy Safety Service if the consumer does not agree to have this done.

What to do when replacing an appliance in an IPI system

A replacement appliance may be installed in the normal way, but additional checks should be made to ensure that the secondary regulator on the existing inlet pipework to the appliance is working correctly. For high flow appliances, such as instantaneous water heaters, there may be insufficient capacity in the IPI system and replacement using conventional pipework system may be necessary. Then complete any other commissioning work, the safety checksheet for the rest of the IPI system (see Safety checks for IPI systems), and the Gasfitting Certification Certificate for the installation.

Safety checks for IPI systems

If during your gasfitting work, you come across a domestic IPI system, you are requested to complete a short check-sheet (attached) to assist in assessing the general conditions of IPI systems. Please return a copy of the checksheet to the Plumbers, Gasfitters and Drainlayers Board either with the Gasfitting Certification Certificate or directly by fax or post at the address shown.

The following checks are recommended:

- 1 Check pipework layout - to confirm that it complies with the specification and one of the acceptable diagrams shown in this notice.
- 2 Pressure test of IPI piping system as per Gas Installation Standard NZS5261 - for leaks.
- 3 Measure gas supply pressure at the outlet of the gas meter.
- 4 Inspect pipework - for signs of rodent attack, UV damage or other.
- 5 List the types of appliances connected.
- 6 Check appliances - for ignition, combustion, flame pattern, sooting, and spillage.
- 7 Measure secondary regulator outlet working and lock up pressures (measure pressure after 3-5 minutes standing period) at each appliance.
- 8 Note the type of appliance regulator.
- 9 Finally, add any information on known problems with the installation.

For further information contact:

Energy Safety Service, Ministry of Consumer Affairs,

PO Box 1473, Wellington

Phone (04) 472 0030

Fax (04) 460 1365

email info@ess.govt.nz,



energysafetyservice

te ratonga whakaruru pūngao



**Gas Association
of New Zealand**



**PLUMBERS, GASFITTERS
AND DRAINLAYERS BOARD**

Checksheet for IPI system

Please make a copy of this form and then complete the following for an IPI system

Address of premises: _____

Pipework checks

Does layout comply with IPI specification*?			
Pipework leakage test	Test pressure (kPa)		
	Test result		
Pressure at outlet of gas meter (kPa)			
Pipework	<input type="checkbox"/> Nylon		
	<input type="checkbox"/> Copper <input type="checkbox"/> Compression Joint <input type="checkbox"/> Brazed		
	Pipework condition:		
Any known problems with the installation			

Appliance and Secondary Regulator checks

Appliance type			
Appliance performance	Ignition		
	Combustion		
	Flame pattern		
	Sooting		
	Spillage		
Secondary regulator outlet working pressure (kPa)			
Secondary regulator lock up pressure (kPa)			
Appliance Regulator Type			

Gasfitter's Name: _____ Date of check: _____

Gasfitter's Address _____

_____ Gasfitter's Registration No _____

Gasfitter's Telephone No _____

Please return this form to:
 Plumbers, Gasfitters and Drainlayers Board,
 PO Box 30 229, Lower Hutt
 Fax (04) 589 5390

*Note: An interim specification for the IPT system - Interim Specification: *IPI System, Revision 1*, 15 May 1987, is held by Energy Safety Service and copy is available on request

