

taking natural gas further  
**fir**mus  
energy



**Safety advice for excavating  
in the vicinity of natural gas  
apparatus**

## Key safety numbers

### Dial B4 U Dig

When planning any excavation works call our 'Dial B4 U Dig' service on

**08456 08 00 66**

to obtain up to date gas network drawings.

Drawings older than 3 months may be out of date, therefore you should always ask for an updated version of the information. Your 'designer' may have requested information on your behalf, however you **must** always confirm with firmus energy that this information is correct.

The gas pipes and associated apparatus are depicted in colour on our drawings. Therefore it is very important that you always use a firmus energy colour drawing on site.

The Dial B4 U Dig service operates from 8.30am to 5pm, Monday to Thursday and 8.30am to 3.45pm, Friday (excluding Public & Bank Holidays).

### Damaged gas apparatus

If you have damaged a gas pipe, please call the Northern Ireland Gas Emergency Centre immediately on

**0800 002 001**

even if you suspect that no gas is leaking

This service operates, 24 hours a day, 365 days a year

### Think you smell gas?

If you think you can smell gas, please call the Northern Ireland Gas Emergency Centre immediately on

**0800 002 001**

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## The firmus energy gas network

firmus energy is always expanding it's natural gas network to connect new customers and currently supply 37 towns and cities throughout the province. The map below lists the towns where we are developing the firmus energy natural gas network. There may be additional towns connected since the publication of this booklet, therefore you should always contact the Dial before you Dig service before you consider carrying out any excavation.

You also need to consider the possibility that the firmus energy network is laid between these towns.



Fig. 1 – schematic showing the extent of the firmus energy natural gas network

## Characteristics and behaviour of natural gas

Natural gas is:

- Highly flammable
- Lighter than air and will rise when released
- Non toxic (but can asphyxiate in enclosed or confined spaces)
- Made up mostly of methane and has a smell added for safety purposes

If unrestricted an uncontrolled gas escape e.g. damage, will rise and disperse into the atmosphere.

If the path of the gas is restricted, the gas will travel through the line of least resistance, and could travel further in ducts, drains, voids etc. This increases the risk of gas entering a property and the possibility of ignition causing an explosion.

**Under no circumstances should the flow of gas be restricted with any machinery or equipment if you have damaged any gas apparatus. Also, do not operate any underground valves.**

**Underground valves must only be operated by a competent firmus energy engineer.**

Remember if you have damaged any gas apparatus, immediately call the Northern Ireland Gas Emergency number 0800 002 001.

## Risks of damaging a gas pipe

### Highest Risk

Mechanical excavators pose the highest risk and should not be used within 500 mm of a known gas pipe.

### High Risk

Hand held power tools should not be used directly over the line of a gas pipe, unless it has been positively located by hand and a safe working distance has been established. Damage to gas pipes from power tools presents a high risk to the operatives involved in the work.

### Low Risk

Hand digging using shovels and spades presents a lower risk of damaging a gas pipe. This method should be used where the presence of gas pipes is suspected or when excavating close to a known gas pipe.

For more information on excavating around gas pipes and other utilities, please refer to guidance document HSG47 - Avoiding Danger from Underground Services which is produced by the Health and Safety Executive (HSE).

## Risks from a damaged gas pipe

- Remember when gas escapes or is released in an uncontrolled manner; it can fuel a fire, give rise to an explosive atmosphere or cause asphyxiation.
- If you suspect there is a gas leak, immediately call the 24 Hour Gas Emergency Service on

**0800 002 001**

- Gas can quickly fill underground cavities, follow the line of other buried utilities and travel into buildings
- Gas can only burn if exposed to an ignition source:
  - Do not turn electrical switches on or off (including doorbells)
  - Do not use naked flames or smoke
  - Do not use mobile phones in the vicinity
  - Do not operate any plant or machinery
  - Do not try to repair the damaged plant
- Move people away from, and upwind of, the affected area.
- Prevent access to the area
- If gas has entered a confined space or building
  - Do not expose to an ignition source
  - Open doors and windows
  - Turn the gas supply to the building (if it is safe to do so)
- Make yourself known to the firmus energy engineer and provide information and assistance (if required), when they arrive on site

## Distribution pipes

The firmus energy network is predominantly constructed from Polyethylene (PE), pipes which are orange or yellow in colour. The size of these pipes can vary from a domestic service of 20mm diameter to a large distribution main of 450mm diameter. These pipes can operate at varying pressures, but are normally either Low Pressure (LP – up to 75mbar) or Medium Pressure (MP – up to 4bar)

firmus energy will normally lay marker tape or marker boards above the pipe to inform operatives that there is gas apparatus below. However, this can only be done when we use traditional open cut techniques to install the mains and services.

Firmus energy use 3 construction techniques:

1. Open Cut – involves digging a trench, laying the pipe and surrounding the pipe with sand, quarry dust or pea gravel, overlaid by marker tape and/or marker boards, and then backfilled



*Fig. 2 – photo showing the traditional open cut technique*

2. Directional Drilling or Impact Moling – a mechanical means of ground movement which is then filled by pulling the pipe through the bore left behind. For obvious reasons there is no marker tape or boards laid above the pipe. There can be considerable distance between excavations (typically up to 100m).



*Fig. 3 – photo showing directional drilling technique*

3. Insertion – the use of ducts or old towns gas mains as a carrier main to push the new PE main through. Again the main will not have marker tape or marker boards laid above.



*Fig. 4 - photo showing insertion*

***Note: where a gas pipe has been installed using “no-dig” techniques such as directional drilling or insertion, it will not have marker tape or a sand/dust surround.***

## How to identify our apparatus

There are a number of techniques that can be used to identify the location of our apparatus, these should be used in conjunction with each other:

- Request drawings from firmus energy of gas apparatus within your works area. The drawings should be legible and understood by all who may need to use them. Please refer to the '[How to Use our Dial B4 U Dig Service](#)' section for more information on how to request drawings.

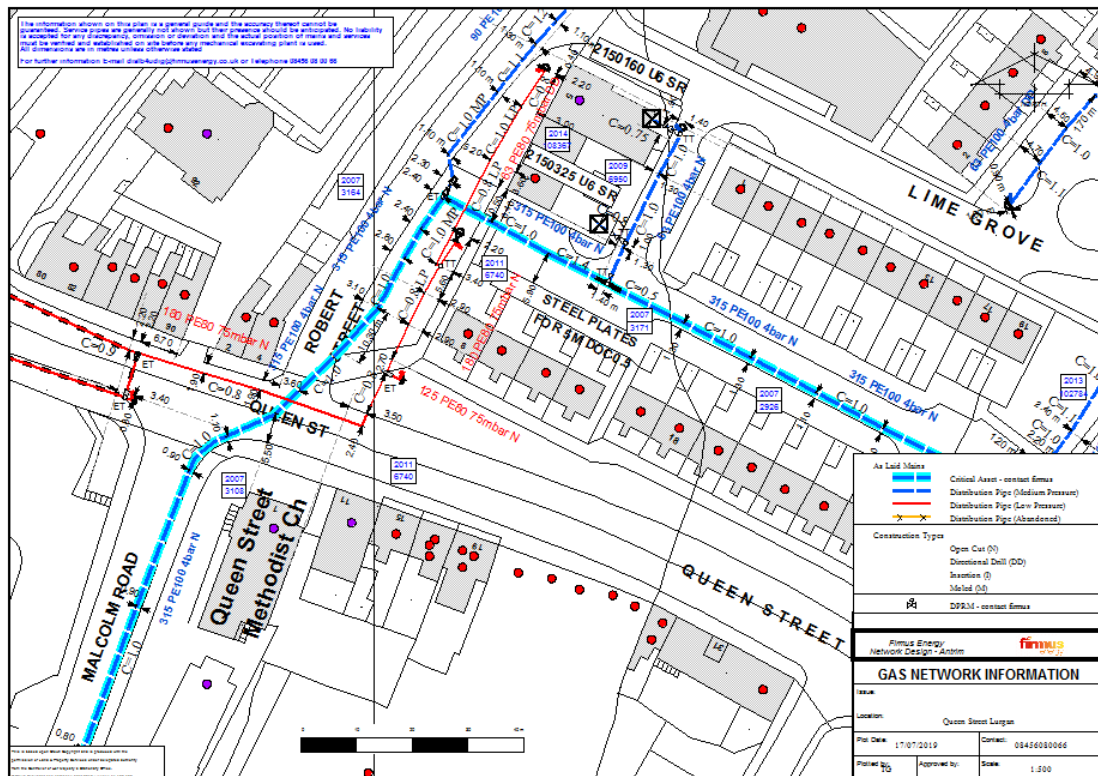


Fig. 5 – typical gas utility drawing issued by firmus energy

- Undertake a site survey to identify both gas street furniture and evidence of gas services. You can easily identify the location of gas pipe by looking for gas toby lids, meter boxes, service entry points and scars on the road. **Please note that domestic gas services are not shown on our drawings.**
- Hand dig trial holes in order to confirm the location of the gas pipe

Some buildings may have a service that is not readily identifiable through any of the above means. Care should always be taken if you suspect that a service may be present.

Service connections will normally be made by means of a Top Tee. This will rise approximately 250-300mm above the gas main. This is a further reason for not using any mechanical excavators etc. within 500mm of a known gas pipe.



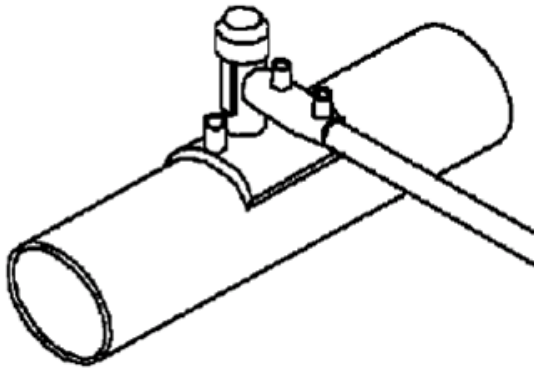


Fig. 6 –Typical top tee connection

## Depth of cover

firmus energy attempts to standardise the depths of the presence of our mains and services (see table below). However, due to ground conditions and other utility apparatus, it is not always possible to maintain a constant depth. This may also mean that it is necessary to lay at a lesser or greater depth than specified below.

Type of Pipe	Road	Verge/Footway	Private
Medium Pressure (MP) Gas Main	1000mm	750mm	N/A
Low Pressure (LP) Gas Main	750mm	750mm	N/A
Medium Pressure (MP) Gas Service	750mm	750mm	750mm (rising to 375mm)
Low Pressure (LP) Gas Service	750mm	450mm	450mm (rising to 375mm)

Fig. 7 – table showing typical depths of cover to firmus energy gas pipes. Note these figures are guidelines and depths should be confirmed by sufficient hand dug trial holes.

## Valves and purge points

Some gas pipes will have valves connected to them – **you should never operate these unless under the direct instruction of a firmus energy engineer.**

Valve boxes are constructed to allow future access to underground valves and can be identified during the site survey (typical toby lid types are shown in the photos below). These boxes may also contain a purge point (PP) which rises above the pipe and terminates close to ground level. These are used by our engineers to monitor the network.

Toby lids are constructed of two materials; ductile iron lids are used in the carriageway and concrete lids are typically used in footways and grass areas. Toby lids which contain gas apparatus will usually have 'GAS' written on them.

Please take care when excavating near any gas lid. Mechanical excavators should not be used within 500mm.



*Fig. 8 – photos showing a cast iron and concrete gas toby lid*

Below is a typical construction diagram of a valve and purge point construction (please note the difference in finished level of both).

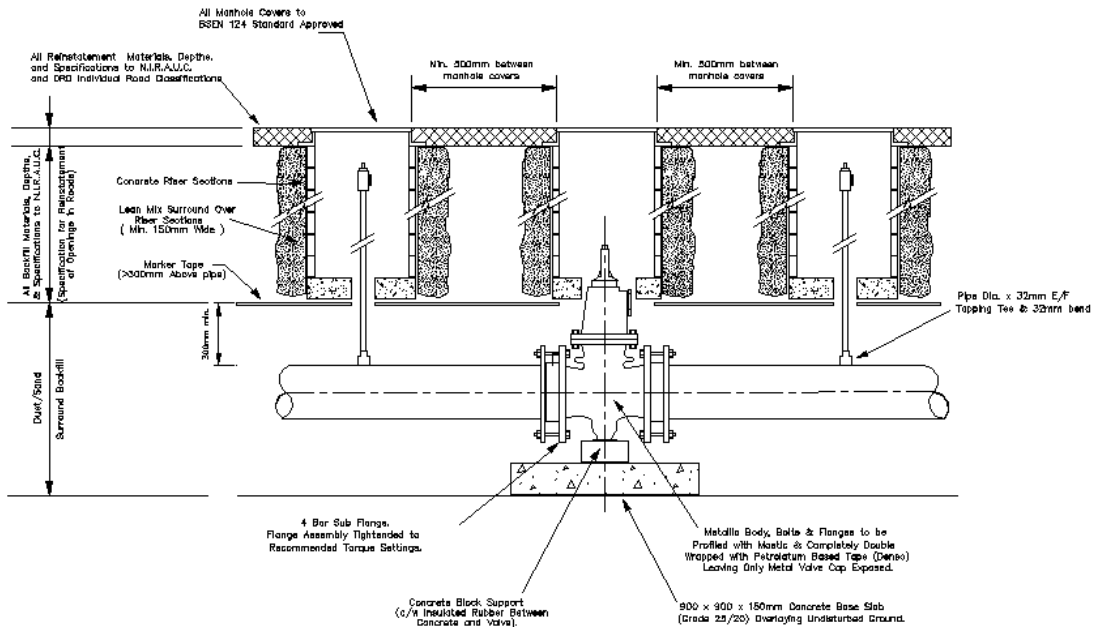


Fig. 9 – schematic showing a typical steel valve construction

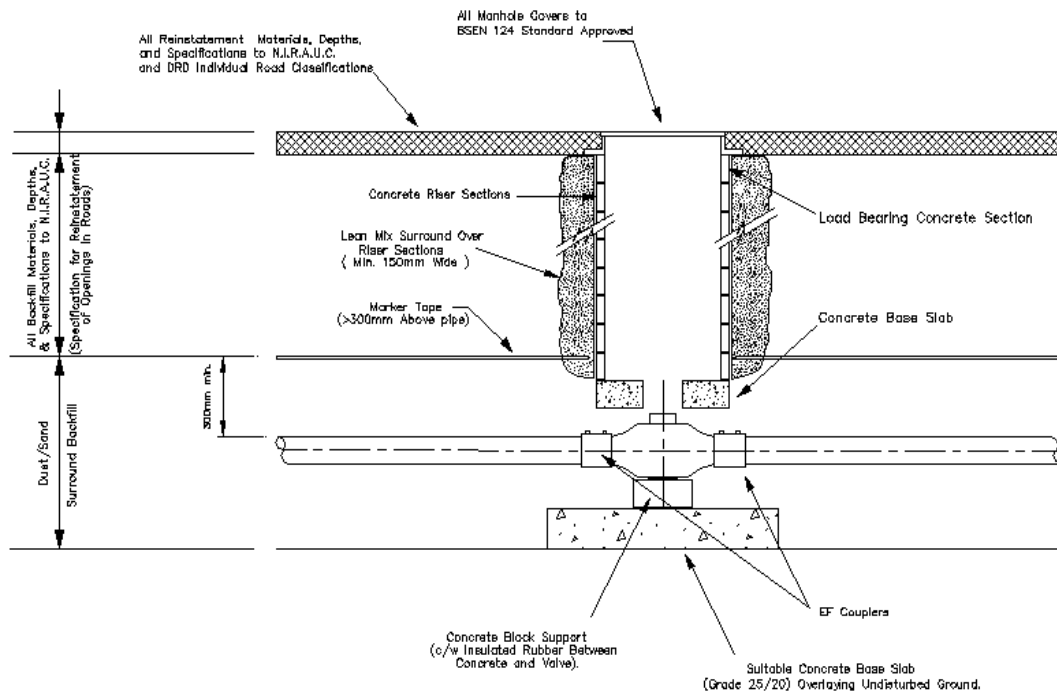
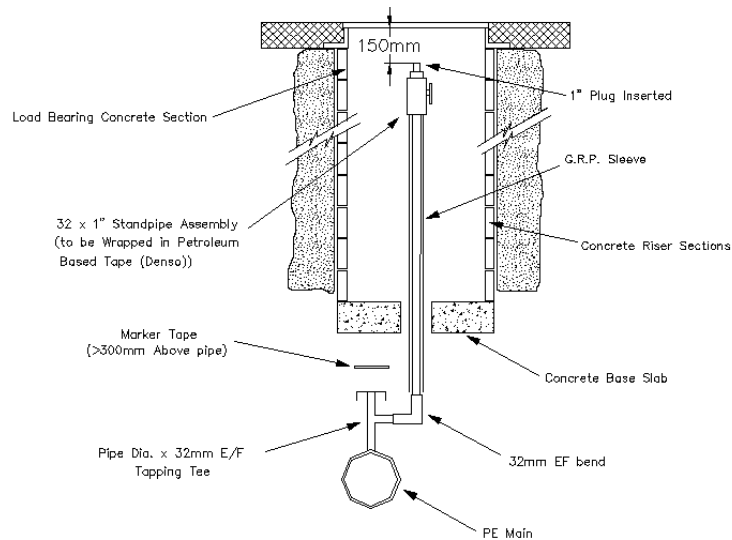


Fig. 10 – schematic showing a typical PE valve construction



*Fig. 11 – schematic showing typical purge point construction*

Please note that we do not detail all purge points on our drawings. Some may have been partially removed as they are no longer needed, and therefore sealed beneath ground closer to the main. This is another reason why mechanical excavation should not be used within 500mm of a known gas main or gas service.



*Fig. 12 – photo of a capped purge point as it is no longer required*

## Domestic meters

There are a number of different types of domestic gas meter installations. Gas meters are normally installed externally and are usually located at the front or along the gable wall of the domestic property. Typical meter box installations are outlined below:



Recessed meter box



Surface mounted  
meter box



Multi-box

*Fig. 13 – photos showing the different types of domestic meter boxes*

## Internal meters

In some cases firmus energy may be required to install a gas meter inside a property. Although a meter box will not be visible outside the property, there may be apparatus which may indicate gas supply to the property, such as a House Entry Tee (HET) and a steel / PE riser as shown below.



HET



Steel or PE riser

Domestic services are normally installed perpendicular to the gas main. Therefore identifying a domestic meter box, HET or steel/PE riser should help to identify the location of the gas service and possible route.

## Industrial and commercial (I&C) meters

There are various different types of industrial and commercial (I&C) gas meter installations, as shown below (care should be taken when working in the vicinity of meter installations and the movement of vehicles curtailed to prevent accidental damage to the meter enclosure):



## How to use our Dial B4 U Dig service

firmus energy provides a Dial B4 U Dig service to enable those involved in excavation works to obtain drawings of the natural gas network in advance of starting their works. These should be requested during the planning phase, as the gas network is a potential hazard which can be avoided through good planning and execution of work.

This service operates from 8.30am to 5pm, Monday to Thursday, 8.30am to 3.45pm Friday (Except Bank/Public Holidays). **Where possible, please contact us to request drawings a minimum of 5 working days in advance of your works.**

Drawings will be sent out by email and by post where requested. When contacting firmus energy to request a map, ensure you give the precise location of the intended works. You may also be required to give some information regarding the nature of the planned work, i.e. start date, any increased risk activity, such as driving piles, directional drilling, deep foundations etc.

If there is a period of time between the planning and construction phase of the works, these drawings should be requested again to ensure there has been no substantial change to our network. We would normally recommend drawings are no greater than 3 months old before the construction phase of the works begins.

The contractor carrying out the works should always receive a copy of the original firmus energy drawings (in colour) and have this readily available on site.

You can request Dial B4 U Dig information from the firmus energy records department by:

**Telephone - 08456 080 066**

**Email - [dialb4udig@firmusenergy.co.uk](mailto:dialb4udig@firmusenergy.co.uk)**

firmus energy will endeavour to have a response to you within five working days.

If on receipt of the drawings, the area covered does not correspond with your planned work area, please do not hesitate to contact us immediately. **Do not start work without the required drawings on site.**

## How to interpret our drawings

All contractors need to understand the information provided on our drawings, so that they can correctly interpret the information. The following section will detail what information you can acquire from our drawings.

It is essential that the original firmus energy drawing (or a colour copy) is provided to the contractor, as we detail the pressure systems in different colours:

**Red** = Distribution Low Pressure (up to and including 75 mbar)

**Blue** = Distribution Medium Pressure (greater than 75 mbar up to 4 bar)

**Note: firmus energy do not provide information on Operators Transmission pipelines. You must contact the Transmission, as this is not part of the firmus energy network. Working in the vicinity of the Transmission pipeline may pose a significant hazard to your workers.**

Generally, our gas mains will be laid at a depth between 750mm and 1000mm for traditional open cut trenches. However it may be necessary to deviate from these due to existing services or ground conditions. The drawings will indicate the approximate depth of the pipe by the notation **C=\*\***, which will indicate the depth in metres (m) e.g. C=0.75, means 750mm cover to the crown of the pipe.

The dimensional distances indicate the location of the pipe from a known point at ground level. This could be from a building line, a kerb line or hedge rows and fence lines where these are not denoted on the map, for example, in rural areas.

The details shown on our drawings of the pipe line are extensive and may aid the contractor in confirming, with trial holes, that they have located our apparatus. These details can be broken into 5 sections:

1. Diameter (outside) of the pipe
2. Type of material used
  - a. PE – Polyethylene
  - b. ST – Steel
3. The Maximum Operating Pressure (MOP) of the pipe
4. The method of lay
  - a. N – Traditional Open Cut
  - b. DD – Directional Drill
  - c. I – Insertion (the size of the carrier main should be detailed in brackets)
  - d. M - Moled

The following snapshots show how this information is depicted on our drawings:

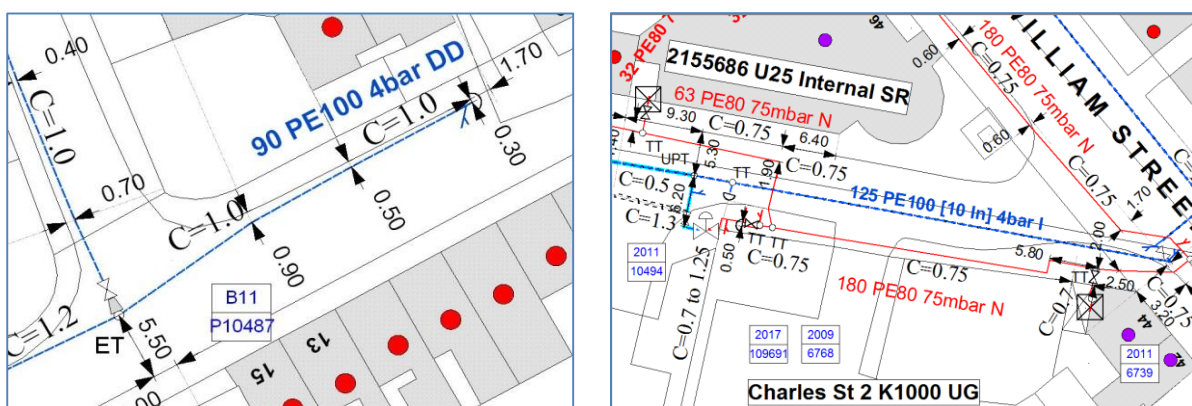




Fig. 12 – Examples of as-laid drawings supplied

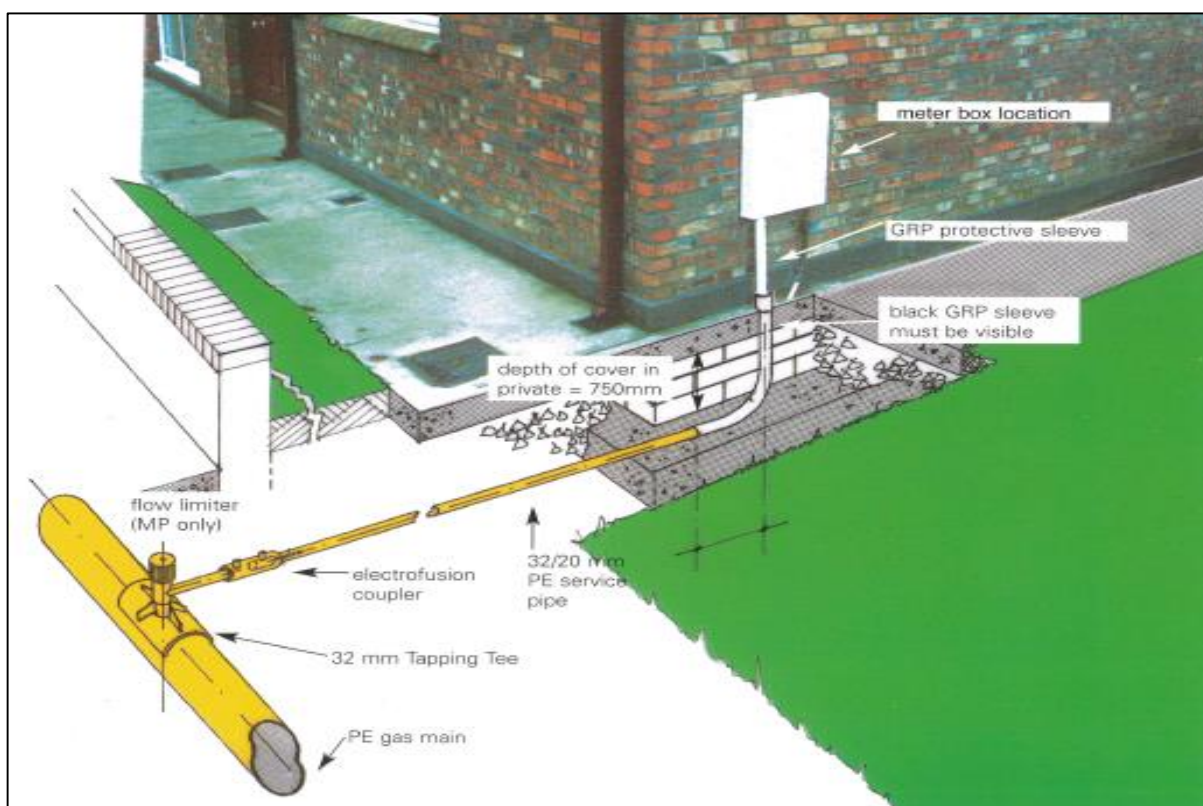


A valve is denoted by the following symbol , and you will be able to identify this on site by looking for either of the corresponding top lids. Please refer to the section [Valves and Purge Points](#) valves for more information on locating these.

A tee is denoted by the  symbol along with the annotation 'ET' for an equal tee, 'TT' for a top tee and 'CT' for a concession tee.

All of our drawings will include a drawing legend for guidance. Please note that we do not detail all service pipes on our drawings, and you should assume the presence of gas services until you can confirm otherwise.

Service connections are normally made to a gas main using a top tee. A coupler connects the service pipe to the top tee with service pipework usually installed at 750mm depth of cover. Note the depth of cover will normally reduce to approximately 375mm as the service pipe approaches the meter box.



*Fig. 13 – schematic showing a typical service installation*

If there have been alterations made in the road layout (e.g. roads, footpaths and grass verges) since the original installation of the gas main or service, the accuracy of our drawings may be compromised. The depth of cover or proximity distances may be inaccurate. If you suspect the road layout has changed, or if the drawings are not confirmed by your trial holes, contact firmus energy immediately for clarification. **Do not continue with your work.**

## Safe systems of work (SSoW)

Safe systems of work, as recommended by Health and Safety Executive of Northern Ireland (HSENI) should be employed on all projects.

A safe system of work will include the following elements:

- Planning
- Obtaining and using utility drawings
- Identifying pipes / services
- Safe digging practices

Note: Extra care should be taken when performing 'hot works' (such as welding) where a gaseous atmosphere may exist. If such task is required firmus energy must be consulted.

## Critical plant & apparatus

firmus energy identifies apparatus which is critical to the safe supply of gas to our customers. If you are working in the vicinity of such plant, firmus energy will request that one of our engineers are on site while you undertake any excavations (including trial holes).

## Critical gas mains


Some mains are deemed by firmus energy to be of special importance due to the nature of the system design. Typically, this would be feeder mains from the Above Ground Installations (AGIs) which supply gas from the Transmission Pipelines into our network.

Firmus energy may also designate other gas mains to be of significant importance, and will note these as critical.

Where firmus energy denotes the gas main to be 'Critical' in our correspondence, we ask that you contact us to ensure our engineer is on site during your works.

## District pressure reduction modules (DPRMs)

District Pressure Reduction Modules (DPRMs) control the pressure of the gas supply to parts of our network. Due to the importance of this apparatus, we require our engineer to be in attendance when you are working in the vicinity of this equipment and we insist that a Permit to Work (PtW) system is implemented during these works.

You can identify DPRM's on our drawings by the annotation 'UG' or 'AG' alongside a  symbol, DPRM's can be Under Ground (UG) or Above Ground (AG).

### Below Ground

#### H40scmh



#### H160scmh



#### 1000scmh



**Above Ground**

**R465**



**R80**



## Transmission pipelines

Although Transmission pipelines are not part of the firmus energy distribution network, any work in the vicinity of these could have serious consequences to both your operatives and the supply of natural gas to our network. Thus, we insist that you also contact the Transmission Operator(s) before commencing your works.

## What to do if a gas pipe is damaged (or if you smell gas)

If you smell gas or suspect damage to our gas apparatus, you should observe the following:

- Move all personnel to a safe distance from the source
- Contact the Northern Ireland Gas Emergency Centre on **0800 002 001**
- Give details of your exact location (including post code if you know it)
- Follow the guidance the operator gives you
- Prevent anyone from entering the danger area
- Do not turn any electrical apparatus on or off
- Do not operate any plant or equipment
- Extinguish any naked flames and prevent smoking in the area
- Do not attempt to make a repair yourself
- Do not attempt to restrict the flow of gas in any manner
- Do not operate any gas valves (in the footway or roadway) without the direct instruction from a firmus energy engineer
- Remain on site and assist the firmus energy engineer when he/she arrives

Remember, any damage to gas pipes must be reported to firmus energy, even if you suspect that no gas is leaking.



## **Key contact numbers**

**Dial Before You Dig - 08456 08 00 66**

**Northern Ireland Gas Emergency Centre – 0800 002 001**

**firmus energy Head Office – 0330 024 9000**