

Communication 1830

***LP SUPPLY PRESSURE WORKING GROUP
RECOMMENDATION FOR CHANGES TO
WORKING PRACTICE***



*Founded 1863
Royal Charter 1929
Patron: Her Majesty the Queen*



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1 EXECUTIVE SUMMARY

1.1 Introduction

1.1.1 During 2016, following complaints raised by Gas Safe registered gas engineers (RGE) to the Standards Consultation Forum (SCF) work was carried out by the Gas Distribution Network (GDN) companies to produce an Energy Networks Association (ENA) document entitled “Gas industry bulletin – Response to poor pressure reports”. The document that was provided to the SCF was not seen by this industry group as satisfying their concerns of incidents of low pressure experienced by RGEs. As a result, SCF made a request that IGEM facilitate a working group to consider the matter more fully.

1.2 Methodology

1.2.1 IGEM sought agreement from the Technical Coordinating Committee (TCC) to undertake the work on behalf of the industry, which was tabled at a TCC meeting on 6th June 2016. The request was accepted, and the first meeting was convened on 8th June 2017 and chaired by Vic Tuffen, Chairman of IGEM’s Gas Measurement Committee (GMC).

1.2.2 The working group was entitled LP Supply Pressure Working Group and IGEM had written to all its consultees seeking their involvement with the work. There was cross industry engagement with the working group and there were twenty four representatives at the first meeting from amongst the GDNs, meter asset managers (MAMs), large businesses, RGE groups, gas appliance manufacturers, independent consultants, gas appliance test houses, Health and Safety Executive (HSE) and Gas Safe Register.

Note: LP stands for that part of the piped Natural Gas supply available to domestic consumers.

1.2.3 The format for the working group was a workshop with background information prepared for each meeting and a number of questions for the members to debate in small groups. Each group was made up of representatives from across the industry to stimulate conversation between the parties to arrive at a consensus to the answer to the questions.

1.3 Aims

1.3.1 The initial meetings were intended to cover the following aspects of the work:

- legal requirements and guidance for the Natural Gas (NG) low pressure supply Network
- published Standards by British Standards Institution (BSI) and IGEM
- manufacturers’ instructions
- organisations’ internal guidance
- issues raised by the industry.

1.3.2 The outcome of the work was intended to determine the root cause of the issues that originally had been raised by the RGEs at SCF and propose solutions.

1.3.3 There was consensus that:
The current arrangements in place including the legal framework were fit for purpose but there was a need for cooperation across the industry to improve the communication and increase the level of understanding of all affected parties in the different aspects of the gas system.

In particular, the following need to be considered:

- industry to clarify the requirement of pressure on the low pressure supply system
- agree the processes and procedures across the industry, that is upstream and downstream of the emergency control valve (ECV)
- enable the various industry standards and guidance to become consistent in their requirements
- manufacturer’s instructions to be matched with those requirements
- limit the design capacity in kW of a standard domestic supply
- establish the extent and impact, of low pressure incidents on domestic installations.

1.3.4 There have been twenty meetings of the working group with the last meeting with work stream leads was held on 3rd November 2021.

1.4 **Conclusions**

1.4.1 The main conclusion from the work carried out by the LP Supply Pressure Working Group is that there is a disconnect between the expectations of the GDNs and the RGE community and this is not assisted by the inconsistent reference to pressure within the published Standards and guidance.

1.4.2 There was consensus that:
The current arrangements in place including the Legal framework were fit for purpose, but there was a need for cooperation across the industry to improve the communication and increase the level of understanding of all aspects of the gas infrastructure that is upstream and downstream of the ECV.

1.4.3 The Working Group agreed a set of proposals to address the concerns of the industry, which cover:

- limit on the nominal gas load for domestic premises in kW
- harmonise procedures for installing appliances covering:
 - pre-commissioning
 - commissioning
 - post commissioning
 - conditions for reporting low pressure supply
 - response from the emergency service providers.

2 **DOMESTIC (LP) SUPPLY CAPACITY**

A domestic gas load is **capped** at gross heat input of 65 kW.

Note 1: 65 kW equates to the capacity of a U6 meter, which can deliver up to 6 m³ h⁻¹.

Note 2: See T/SP/NP/14/E referenced in Appendix 2.

However, any existing gas service is likely to have been designed for demand appropriate to the property type and appliances at the time it was constructed. It cannot be assumed that the existing service has been designed for 6 m³ h⁻¹.

Where an ECV label has been fitted by the Gas Transporter (GT), reference should be made to service capacity as recorded on the label. This would inform the designer and/or RGE to consider the load requirements and suitability of the total load of appliances within the premises before advising the gas user and pricing the new work request. It may be necessary to approach the GT for a service of increased capacity prior to installation. If a load of more than the original design of the service or exceeding 65 kW is required, the upgrade may be chargeable. Further advice is available in BS 6400 and Technical Bulletins TB 071 and TB 089.

There will be occasions when the gas supply to a domestic premise will be temporarily unable to deliver the load. On these occasions, contact is to be made with the relevant GT. An Emergency Service Provider (ESP) will attend the premises and resolve the issue in conjunction with the RGE, Approved Meter Installer (AMI) and the customer, as appropriate. This might involve agreeing a timely resolution with an end date, if an immediate resolution is not possible (see Sections 3, 4, 5 and Table 1).

3 **PROCEDURES FOR INSTALLING APPLIANCES**

The following procedures relate to the gas supply to the premises for installing appliances.

3.1 **Pre-installation**

To consider if a domestic premise has the gas supply capacity suitable for the intended new appliance(s) the following procedure should be adopted to ensure the existing installation is working at correct pressures.

As soon as possible, and if practicable, operate all the appliances within the premises at a high operating load* and take a reading to confirm that the outlet pressure of the meter after a one-minute stabilisation period is not less than 18.5 mbar and not exceeding 23 mbar.

** Refer to Appendix A1.1 for definition of high operating load.*

3.2 **Commissioning**

Commissioning shall be undertaken in accordance with the Manufacturers' instructions. This confirms the appliance is operating as specified by the manufacturer.

Verify appliance inlet gas pressure as per the Manufacturer's instructions – operate the installed appliance at maximum appliance load**. The value shall be as specified by the Manufacturer.

** **maximum appliance load:** *This is as specified by the Manufacturer in the commissioning instructions e.g., commissioning/chimney sweep mode, or where not specified the appliance is operating at its maximum appliance load e.g., hot water mode on a combination boiler.*

Note: Be aware of any pressure loss between the inlet test point and the inlet to the appliance isolation valve.

3.3 **Post commissioning**

On completion of the commissioning process **all** of the appliances shall be operated within the premises at a high operating load* and reading taken to confirm that the outlet pressure of the meter after a one-minute stabilisation period is not less than 18.5 mbar and not exceeding 23 mbar. This confirms that the newly commissioned appliance is not adversely affecting the gas installation.

* *Refer to Appendix A1.1 for definition of high operating load.*

4 CONDITIONS FOR REPORTING LOW PRESSURE SUPPLY

4.1 Following reports of poor pressure/failure to achieve operating pressure and/or heat input

The RGE may encounter reports of poor pressure or during their work be unable to achieve the appliance's required inlet pressure and/or heat input. In such instances, operate all the appliances within the premises at a high operating load* and take a reading to confirm that the outlet pressure of the meter after a one-minute stabilisation period is not less than 18.5 mbar and not exceeding 23 mbar.

** Refer to Appendix A1.1 for definition of high operating load.*

If the outlet pressure of the meter after a one-minute stabilisation period is below 18.5 mbar, report to the National Gas Emergency Service on 0800 111 999 using the "Reporting of Low Pressure" process (see clause 4.2).

If it is known that these pressures are affecting the safe performance of an appliance, or the appliance is deemed to be unsafe then IGEM/G/11 Gas Industry Unsafe Situations Procedure (GIUSP) shall be followed.

Note: IGEM/G/11 is freely available from IGEM's website www.igem.org.uk.

4.2 Reporting of Low Pressure process

The reporting procedure is:

- 1) Should the working pressure be outside the range of 18.5 mbar to 23 mbar at the outlet of the meter, telephone the National Gas Emergency Service on 0800 111 999 or for Northern Ireland Gas Emergency Service on 0800 002 001.
- 2) RGE to:
 - a) obtain a "Reference Number" for the telephone call
 - b) provide their Gas Safe registration number, if requested
 - c) provide their contact telephone number.
- 3) The ESP should attend site within 2 hours.
- 4) If possible, the RGE should wait for the ESP to attend (if the appliance is new, the RGE shall wait for the ESP or arrange to attend site with the ESP to enable a joint investigation).

Where it is not possible for the RGE to wait, their job report should contain:

- a) confirmation that the internal installation pipework is correctly sized
- b) working pressure measurements taken
- c) any recent changes e.g., new appliances, meter position moved
- d) internal installation's total load.

And, the following actions are required, as appropriate:

- i. for an existing appliance, which affects the safe operation of any appliance e.g., combustion and/or flame stability the appliance shall be made safe in accordance with IGEM/G/11 GIUSP.
- ii. where the installation is new, the appliance must be disconnected from the supply and sealed with appropriate fitting(s) in accordance with Reg 26(5) of the Gas Safety (Installation and Use) Regulations GS(I&U)R as an uncommissioned appliance.

Note: If this action is taken the RGE will need to be available to enable the ESP engineer to undertake a joint investigation.

- 5) ESP takes overall responsibility for investigating the pressure issues, but where possible, the initial testing should be a joint investigation. The ESP shall share the outcome of the investigation with the customer and RGE, as appropriate.

Note 1: The customer may be required to contact their gas supplier. The details of the supplier and the means of contacting them can be found on their bill/invoice or energy statement.

Note 2: GTs need to be aware of incidents of low pressure on the Network, which may not be confined to one premises and action is required to maintain the supply to a number of premises.

5 **ESP RESPONSE AND JOINT INVESTIGATION PROCEDURE**

The following is a typical emergency service provider procedure.

5.1 **ESP – responding to reported pressure problems**

Initial actions

Will attend within 2 hours.

Ask questions such as:

- a) What pressure measurements have already been taken?
- b) Have there been any recent changes e.g., new appliances, meter position moved, service relayed / inserted?
- c) Has internal installation pipework size been checked?
- d) Has the RGE carried out a gas rate check of the appliances?
- e) What is the total load? Does it exceed the meter capacity?

Then carry out the following tasks:

- 1) *If the appliance(s) are new and uncommissioned, providing the RGE, with the appropriate competence is present on site, allow the new appliance(s) to be set up to operate in their commissioning mode. Then check the working pressure at the outlet of the meter installation and ECV by taking a reading to confirm that the outlet pressure of the meter after a one-minute stabilisation period is not less than 18.5 mbar and not exceeding 23 mbar.*

Note: If the outlet pressure of the meter installation falls outside of this range, and if necessary, in order to assist in finding the root cause of the problem, then check the working pressure with appliances operating at normal and/or high operating load.*

Normal load for the new uncommissioned appliance would be set to working on hot water demand to taps and/or heat demand.

** Refer to Appendix A1.1 for definition of high operating load.*

- 2) *If the appliance(s) has been commissioned, check the working pressure at the outlet of the meter installation and ECV by operating all the appliances within the premises at a high operating load* and then take a reading to confirm that the outlet pressure of the meter after a one minute stabilisation period is not less than 18.5 mbar and not exceeding 23 mbar.*

** Refer to Appendix A1.1 for definition of high operating load.*

Note: This may be at the time of an appliance service or maintenance visit.

In the case where pressures are found to be operating within the range not less than 18.5 mbar and not exceeding 23 mbar on the outlet of the meter, arrangements are deemed to be fully satisfactory with any possible issue associated with downstream pipework or the boiler/appliance.

Table 1 below summaries a range of scenarios, indicating where further investigation is required and, in certain cases, the areas in which any investigation may focus.

Reference clause	Working Pressure at the outlet of the ECV	Working Pressure at the outlet of the meter	Status or action
5.1 i.& ii.	≥ 25	≥ 18.5 - ≤ 23	Supply and meter installation Ok If any issues at appliance, downstream pipework requires investigation.
5.1 iv.& v.	≥ 25	≥ 15 - < 18.5	Supply Ok. Meter installation requires further investigation. The GT will make a decision as to the best course of action to address the situation and explain this to the customer/RGE with associated timescale.
5.1 vi.	≥21.5 - ≤25	≥ 18.5- ≤ 23	Supply and meter installation Ok. If any issues at appliance, downstream pipework requires investigation.
5.1 iii.	≥21.5 - ≤25	≥15 - < 18.5	Supply Ok. Meter installation/downstream pipework requires investigation. The GT will recommend the best course of action working in conjunction with the RGE to pragmatically address the situation and explain this to the customer/RGE with associated timescale.
5.1 vi.	≥19 - ≤21.5	≥15	Supply-requires further investigation. The GT will recommend the best course of action working in conjunction with the RGE to pragmatically address the situation and explain this to the customer/RGE with associated timescale.
5.1vi	≥19 - ≤21.5	< 15	Supply and meter installation require further investigation. Pressures suggest an issue with the meter installation. The GT will recommend the best course of action working in conjunction with the RGE to pragmatically address the situation and explain this to the customer/RGE with associated timescale.
5.1 vii	< 19	< 15	Supply requires further investigation. Pressures suggest an issue upstream of ECV. The GT will recommend the best course of action working in conjunction with the RGE to pragmatically address the situation and explain this to the customer/RGE with associated timescale.

TABLE 1: PERFORMANCE PARAMETERS PUBLISHED BY THE GTs

There are Notes to this Table which are on the next page.

Note 1: The pressure loss across the meter is not to exceed 4 mbar, nor pipework between meter outlet and appliance exceed 1 mbar (see Appendix 4).

Note 2: Notes to Table 1 Reference clauses.

5.1 iii If the working pressure at the outlet of the meter is below 18.5 mbar check the working pressure at the outlet of the Emergency Control Valve (ECV) to determine that it is within the performance parameters published by the GTs (see Table 1).

Note: On Domestic installations and small Industrial and Commercial installations it may be necessary to insert a fitting incorporating a test nipple between the ECV and the semi rigid connection on the meter installation.

5.1 iv If the working pressure at the ECV is above 25 mbar and the meter installation outlet pressure is less than 18.5 mbar, attempt to adjust the meter regulator.

Note 1 : For installations covered by PEMS attempt is to be made to adjust the meter regulator.

Note 2: If the inlet pressure is below 25 mbar, adjusting the meter regulator could result in the consumer being subjected to an excessive pressure in the future.

5.1 v If the working pressure at the ECV is above 25 mbar, and the outlet to the meter installation is below 18.5 mbar (following appropriate adjustment) then the meter installation is at fault.

Note: For installations covered by Policy Exchange Meter Service (PEMS), the meter installation components are to be replaced as appropriate, for other installations the Meter Asset Manager (MAM) is to be contacted.

5.1 vi Where the pressure at the ECV outlet is between 19 mbar and 21.5 mbar, further investigation may be required by the GT. This would be dealt with on a case-by-case basis.

Note: Contact may be necessary with the Network operator, which is not always the same company that employs the ESP, e.g., Independent Gas Transporters (IGTs).

5.1 vii Where the pressure at the ECV outlet is less than 19 mbar, further investigation may be required by the GT. This would be dealt with on a case-by-case basis.

5.2 Follow up actions

The ESP may carry out further investigations including the standard service 6-minute average pressure test under normal load conditions.

If the average working pressure over a six minute period at the outlet of the ECV is unsatisfactory, and problem limited to a single property, the investigation should focus on the service pipe. Where problems are experienced at adjoining premises, or where there is any history of problems at adjacent properties, the possibility of a wider underlying issue should be considered.

5.3 Checking for incident conditions

Where poor pressure in wider vicinity is confirmed - request support and start an investigation to determine the extent of the affected area by:

- a) Checking opposite and adjacent premises*
- b) Checking pressures at strategic locations in the surrounding area and extremities of the mains, as appropriate.*

Pressure problems are escalated to a manager in the following circumstances;

- c) Where the pressure problem is affecting more than 2 domestic premises or a critical load*
- d) If the supply pressure is fluctuating due to water ingress*
- e) A district governor is suspected to be causing the problem*
- f) If higher pressures than expected are encountered (e.g., above 75 mbar on a LP network).*

If this is due to temporary Network conditions, explain this to the customer/AMI/RGE with a likely timescale for the Network to return to normal operating conditions.

5.4 **Actions to resolve service fault**

If the investigation leads to the conclusion that the service is at fault:

- a) Check the condition of the service – clear of rust and water?*
- b) Check the size of the service*
- c) Check the pressure drop across the service*
- d) Replace the service if required.*

On establishing the necessary course of action, explain this to the customer/AMI/RGE with a likely timescale for resolution.

If the consumer is not satisfied, after the Network Operator has concluded the investigation, the comprehensive GDN complaint procedure should be invoked by the customer. Whereby the ESP should leave contact information with the customer.

6 **NEXT STEPS FOR THE WORKING GROUP**

- 6.1 The industry comment had been received, collated and reviewed by the work stream leads of the working group and responses agreed. The outcomes were shared with the whole Working Group at a meeting on 31st March 2022 chaired by Trevor Smallpeice, who also Chair's the SCF, at which the document was accepted for passing to IGEM's technical Committees for approval and publication.
- 6.2 This Communication was published in June 2022.
- 6.3 The working group then considered ways and means of implementing the new procedures and policy and seeking industry acceptance of the outcomes.
- 6.4 Following the implementation of the changes, it is planned to recall the Working Group after 18-24 months to assess whether the intended outcomes of these Recommendations have been achieved and if there is any need to review and make amendments to the Recommendations.

APPENDIX 1 : GLOSSARY, ACRONYMS, ABBREVIATIONS, UNITS AND SYMBOLS

A1.1 GLOSSARY

Standard and legacy gas meter arrangements are given in IGEM/G/1 which is freely available by downloading a printable version from IGEM's website.

Standard definitions are given in IGEM/G/4 which is freely available by downloading a printable version from IGEM's website www.igem.org.uk.

Definitions in this document not included in IGEM/G/4 are:

high operating load

This is the maximum operating load for the entire gas installation in the premises for a period of high demand. To replicate this, operate:

- the highest output appliance (typically the boiler) operating at its maximum load
(For combination boilers, this will be hot water demand to taps, in which case operate all hot taps at full flow)
- and any other appliances at 50% load e.g., hob with 4 burners only 2 are lit.

Note 1 Providing the RGE, with the appropriate competence is present on site, allow the appliance(s) to be set up to operate in their commissioning mode.

Note 2: Modulating gas boilers will operate periodically at maximum output, in normal use, e.g., when heating the house from cold, or combis drawing large hot water flow rates, such as multiple showers/baths being used simultaneously.

Note 3: For appliances with variable rating, they are only to be operated at the agreed or set load for the installation.

Note 4: Lower pressures may be experienced under winter or maintenance conditions (see Appendix 5).

Note 5: Where poor pressure has been reported by the RGE and the ESP attends site then this procedure is to be undertaken in cooperation with the ESP (see Sub-Section 4.2 4)).

maximum appliance load

This is as specified by the Manufacturer in the commissioning instructions e.g., commissioning/chimney sweep mode, or where not specified the appliance is operating at its maximum appliance load e.g., hot water mode on a combination boiler.

normally used

Regulation (EU) 2016/426 on appliances burning gaseous fuels

CHAPTER I GENERAL PROVISIONS

Article 1

Scope

1. This Regulation applies to appliances and fittings.

2. For the purposes of this Regulation, an appliance is considered to be '**normally used**' where the following conditions are met:
- (a) it is correctly installed and regularly serviced in accordance with the manufacturer's instructions;
 - (b) it is used with a normal variation in the gas quality and a normal fluctuation in the supply pressure as set out by Member States in their communication pursuant to Article 4(1);
 - (c) it is used in accordance with its intended purpose or in a way which can be reasonably foreseen.

operating

pressure (OP)

Pressure which occurs within the system under normal operating conditions.

Note: Operating Pressure can be referred to as Working Pressure.

A1.2

ACRONYMS AND ABBREVIATIONS

ACoP	Approved Code of Practice
BSI	British Standards Institution
DMP	design minimum pressure
ECV	emergency control valve
ENA	Energy Networks Association
ESP	emergency service provider
EU	European Union
GAD	Gas Appliance Directive
GA(S)R	Gas Appliance (Safety) Regulations
GB	Great Britain
GDN	Gas Distribution Network
GIUSP	Gas Industry Unsafe Situations Procedures
GMC	Gas Measurement Committee
GS(M)R	Gas Safety (Management) Regulations
GS(I&U)R	Gas Safety (Installation and Use) Regulations
GT	gas transporter
HSE	Health and Safety Executive
IGEM	Institution of Gas Engineers and Managers
LOP	lowest operating pressure
MAM	Meter Asset Manager
MIP	maximum incidental pressure
MOP	maximum operating pressure
OP	operating pressure
P	pressure
PEMS	policy exchange meter service
PLOP	peak load lowest operating pressure
RGE	Gas Safe registered Engineer
SCF	Standards Consultation Forum
STP	strength test pressure
TCC	Technical Coordinating Committee
UK	United Kingdom.

A1.3

UNITS

° C	degree Centigrade
mm	millimetre
m ³	cubic metre
m ³ h ⁻¹	cubic metre per hour
m ³ /hr	cubic metre per hour

mbar	millibar
bar	bar
kW	kilowatt
MJ m ⁻³	megajoule per cubic metre.

A1.4 **SYMBOLS**

%	percentage.
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A1.5 **SUBSCRIPTS**

max	maximum
min	minimum
nom	nominal
u	upstream.

APPENDIX 2 : REFERENCES

This document is set out against a background of Legislation in force in GB at the time of publication. The devolution of power to the Scottish, Welsh and Northern Ireland Assemblies means that there may be variations to the Legislation described below for each of them and consideration of their particular requirements is to be made. Similar considerations are likely to apply in other countries where reference to appropriate national Legislation is necessary. The following list is not exhaustive.

Where British Standards etc. are quoted, equivalent national or international Standards etc. equally may be appropriate.

A2.1 BRITISH STANDARDS

BS 6400-1	Specification for installation, exchange, relocation, maintenance and removal of gas meters with a maximum capacity not exceeding 6 m ³ /h. Low pressure (2nd family gases)
BS 6891	Specification for the installation and maintenance of low pressure gas installation pipework of up to 35 mm (R1¼) on premises
BS EN 437	Test gases - Test pressures - Appliance categories.

A2.2 IGEN

IGEM/G/1 Edition 2	Defining the end of the Network, a meter installation and installation pipework
IGEM/G/4 Edition 2	Definitions for the gas industry
IGEM/TD/4 Edition 4	PE and steel gas services and service pipework
IGEM/GM/6 Edition 2	Non-domestic meter installations. Standard designs
IGEM/GM/8 Parts 1-5 Edition 2	Meter installations with flow rate exceeding 6 m ³ h ⁻¹ and inlet pressure not exceeding 38 bar
IGEM/GM/PRS/3	Meter regulators for gas flow rates not exceeding 6 m ³ h ⁻¹ and inlet pressures not exceeding 75 mbar
IGEM/UP/2 Edition 3	Installation pipework on industrial and commercial premises.

A2.3 ORGANISATION GUIDANCE

T/SP/NP/14/E	Specification for service pipes
TB071	Checking the operating pressure of the meter regulator - Natural gas
TP089	Requesting a gas supply to a domestic property

APPENDIX 3 : LEGISLATION AND GUIDANCE

A3.1 The principal Regulations, which reference the legal requirements relating to supply pressure in the NG Network are shown below:

- Gas Safety (Management) Regulations (GS(M)R) 1996
- Gas Safety (Installation and Use) Regulations (GS(I&U)R) 1998 (as amended)
- Gas Appliance Directive (GAD) 1990 superseded
- Gas Appliance (Safety) Regulations (GA(S)R) 1992 and 1995
- Regulation (EU) 2016/426 on appliances burning gaseous fuels
- The Gas Appliances (Enforcement) and Miscellaneous Amendments Regulations 2018
- The Gas (Calculation of Thermal Energy) Regulations 1996 (as amended).

A3.2 **Selected extracts from the Regulations**

Note: This document does not always use precisely the definitions given below. Where definitions for terms within this Appendix are not given, the definition as given in the appropriate Regulations, ACoP or Guidance applies.

A3.2.1 **GS(M)R**

Schedule 1

Content and other characteristics of gas

15 *Particulars to demonstrate that the duty holder has established adequate arrangements to ensure that all gas he conveys complies with Regulation 8.*

Guidance

142 *The safety case should describe the arrangements the transporter has put in place to provide sufficient pressure at the end of the service pipe to ensure that gas appliances which consumers might reasonably be expected to use operate safely wherever the premises are situated on the network. This should include any pressure management techniques used to deal with the expected variations in consumption between peak and normal demands throughout the year.*

17 *Particulars to demonstrate that the duty holder has established adequate arrangements to ensure that the gas he conveys will be at an adequate pressure when it leaves the part of the network used by him.*

Schedule 3 Part 1

3 *The gas shall be at a suitable pressure to ensure the safe operation of any gas appliance (within the meaning of Regulation 2(1) of the 1994 Regulations) which a consumer could reasonably be expected to operate.*

A3.2.2 GS(I&U)R

Regulation 14 Regulators

Summary of Regulation 14

This regulation stipulates the protection arrangements for maintaining gas pressure within safe limits. Requirements are also included for sealing regulators against unauthorised interference.

Regulation 14(1)

No person shall install a primary meter or meter by pass used in connection with a primary meter unless –

- (a) there is a regulator controlling the pressure of gas supplied through the meter or the by pass, as the case may be, which provides adequate automatic means for preventing the gas fittings connected to the downstream side of the regulator from being subjected to a pressure greater than that for which they were designed;*
- (b) where the normal pressure of the gas supply is 75 millibars or more at the inlet to the regulator, there are also adequate automatic means for preventing, in case the regulator should fail, those gas fittings from being subjected to such a greater pressure; and*
- (c) where the regulator contains a relief valve or liquid seal, such valve or seal is connected to a vent pipe of adequate size and so installed that it is capable of venting safely.*

Regulation 14(5)

Where a person installs a regulator for controlling the pressure of gas through a primary meter, a meter by pass used in connection with a primary meter or from a gas storage vessel or installs a gas appliance itself fitted with a regulator for controlling the pressure of gas to that appliance, he shall immediately thereafter ensure, in either case, that the regulator is adequately sealed so as to prevent its setting from being interfered with without breaking of the seal.

Regulation 14(6)

In relation to –

- (a) gas from a distribution main, no person except the transporter or a person authorised to act on his behalf;*
- (b) gas from a gas storage vessel, no person except the supplier or a person authorised to act on his behalf,*

shall break a seal applied under paragraph (5) above other than a seal applied to a regulator for controlling the pressure of gas to the appliance to which that regulator is fitted.

Regulation 14(7)

A person who breaks a seal applied under paragraph (5) shall apply as soon as is practicable a new seal which is adequate to prevent the setting of the regulator from being interfered with without breaking such seal.

Regulation 26 Gas appliances – safety precautions

Regulation 26(9)

Where a person performs work on a gas appliance he shall immediately thereafter examine –

- (a) the effectiveness of any flue;*
- (b) the supply of combustion air;*
- (c) subject to sub-paragraph (ca), its operating pressure or heat input or, where necessary, both;*
- (ca) if it is not reasonably practicable to examine its operating pressure or heat input (or, where necessary, both), its combustion performance;¹*
- (d) its operation so as to ensure its safe functioning,*

and forthwith take all reasonably practicable steps to notify any defect to the responsible person and, where different, the owner of the premises in which the appliance is situated or, where neither is reasonably practicable, in the case of an appliance supplied with liquefied petroleum gas, the supplier of gas to the appliance, or, in any other case, the transporter.

1 Regulation 26(9)(c) was amended by the Gas Safety (Installation and Use) (Amendment) Regulations 2018.

A3.2.3 Gas Appliance Directive (GAD) (this directive was superseded by GAR)

Article 2(2) of the GAD requires each EU Member State to communicate in good time to the other Member States and the Commission all changes to the types of gas and corresponding supply pressures used on their territory. This information is generally taken as being the "normal variations" referred to in article 7(2).

Considering Natural Gas only, the UK has declared the following (see: <https://ec.europa.eu/docsroom/documents/16261/attachments/1/translations/en/renditions/pdf>):

- A Wobbe Index range of 46.5 MJ m⁻³ - 52.85 MJ m⁻³ which corresponds to the emergency limits of the Gas Safety (Management) Regulations 1996, and
- A supply pressure range of 18.5 mbar – 21 mbar with a footnote that says "Meter outlet pressure".

A3.2.4 Gas Appliance (Safety) Regulations (have been superseded by The Gas Appliances (Enforcement) and Miscellaneous Amendments Regulations)

Essential requirements

Regulation 3

- (1) For the purposes of these Regulations—*
 - (a) subject to paragraph (2) below, an appliance or a fitting shall be taken to satisfy the essential requirements,—*
 - (i) if it satisfies a national standard which implements the relevant harmonised standard; or*
 - (ii) where there is no relevant harmonised standard, if it satisfies a national standard of which the text is communicated to the Commission pursuant to Article 5(2) of the Directive and which, pursuant to that provision, is notified by the Commission to the member States as being presumed to conform to the essential requirements; and*
 - (b) a quality system shall be taken to satisfy the requirements of these Regulations if it complies with a national standard which implements the relevant harmonised standard.*

Appliances and fittings to satisfy the essential requirements and to be safe

Regulation 7

- (1) *No Manufacturer or his authorised representative established in the Community shall supply an appliance or a fitting which does not satisfy the essential requirements.*
- (2) *No person shall supply an appliance which, when normally used, is not safe; and, in this paragraph, "normally used" in relation to use means use—*
 - (a) *when correctly installed and regularly serviced in accordance with the Manufacturer's instructions referred to in paragraph 1(2) of Annex 1 of the Directive (set out in Schedule 3);*
 - (b) *within the normal variations of gas quality and pressure; and*
 - (c) *in accordance with its intended purpose or in a way which can reasonably be foreseen.*

A3.2.5 **Regulation (EU) 2016/426 on appliances burning gaseous fuels**

CHAPTER I

GENERAL PROVISIONS

Article 1

Scope

1. *This Regulation applies to appliances and fittings.*
2. *For the purposes of this Regulation, an appliance is considered to be 'normally used' where the following conditions are met:*
 - (a) *it is correctly installed and regularly serviced in accordance with the manufacturer's instructions;*
 - (b) *it is used with a normal variation in the gas quality and a normal fluctuation in the supply pressure as set out by Member States in their communication pursuant to Article 4(1);*
 - (c) *it is used in accordance with its intended purpose or in a way which can be reasonably foreseen.*

Article 4

Gas supply conditions

1. *By 21 October 2017, Member States shall communicate to the Commission and the other Member States in accordance with Annex II and using the relevant form the types of gas and corresponding supply pressures of gaseous fuels used on their territory. They shall communicate any changes thereof within six months after the announcement of the envisaged changes.*
2. *The Commission shall be empowered to adopt delegated acts in accordance with Article 41 concerning modifications to the content of the Member States' communications of the gas supply conditions on their territory, as set out in Annex II, in order to take into account the technical developments with regard to the gas supply conditions.*

A3.2.6 **The Gas Appliances (Enforcement) and Miscellaneous Amendments Regulations**

Citation, commencement and interpretation

- 1.—(1) *These Regulations may be cited as the Gas Appliances (Enforcement) and Miscellaneous Amendments Regulations 2018 and come into force on 21st April 2018.*

(2) In these Regulations—

- "the 1974 Act" means the Health and Safety at Work etc. Act 1974(1);*
- "the 1978 Order" means the Health and Safety at Work (Northern Ireland) Order 1978(2);*
- "the 1987 Act" means the Consumer Protection Act 1987(3);*
- "the 1995 Regulations" means the Gas Appliances (Safety) Regulations 1995(4);*
- "district council" means a district council within the meaning of the Local Government Act (Northern Ireland) 1972(5);*
- "EU Regulation 2016/426" means Regulation (EU) 2016/426(6) of the European Parliament and of the Council on appliances burning gaseous fuels, repealing Council Directive 2009/142/EC(7), as amended from time to time; Application, transitional provisions, savings and revocation*

2.—(1) These Regulations apply to appliances and fittings placed on the market on or after 21st April 2018.

(2) These Regulations do not apply to—

- (a) appliances specifically designed for the uses and purposes specified in Article 1(3); or*
- (b) appliances and fittings which fall within Article 1(4).*

(3) Nothing in these Regulations prevents the showing of appliances or fittings at trade fairs, exhibitions, demonstrations or the like, which are not in compliance with the provisions of EU Regulation 2016/426, provided that a visible sign clearly indicates that such appliances or fittings do not comply with those provisions and that they are not for sale until they are made compliant.

(4) The 1995 Regulations continue to apply, as if they had not been revoked, to appliances and fittings placed on the market before 21st April 2018, and in any such case the consequential amendments made by Schedule 5 do not apply.

(5) The 1995 Regulations are revoked save to the extent required to give effect to paragraph (4).

A3.2.7

The Gas (Calculation of Thermal Energy) Regulations 1996 as amended

Interpretation and application

2.—(1) In these Regulations, unless the context otherwise requires—

"the Act" means the Gas Act 1986;

"appropriate standard temperature conversion system" means a system for converting, with such accuracy as is reasonably practicable, any volume of gas into the volume which that volume would have if the gas had been measured at a temperature of 15°C and at the same pressure;

"appropriate standard volume conversion system" means a system for converting, with such accuracy as is reasonably practicable, any volume of gas into the volume which that volume would have if the gas had been measured at a temperature of 15°C and a pressure of 1013.25 millibars

"temperature and pressure conversion factor", in relation to any meter for registering the volume of gas conveyed to a take off point, means—

- (a) where gas is conveyed to the meter at a rate which is reasonably expected not to exceed 25,000 therms or 732,000 kilowatt hours a year (if the conversion factor within the meaning of paragraph (b) below were applied), 1.02264; or*

- (b) where gas is conveyed to the meter at a rate which is reasonably expected to exceed 25,000 therms or 732,000 kilowatt hours a year (if the conversion factor within the meaning of this paragraph were applied) the number given by the following formula, namely—

$$T \times P \times Z$$

where—

T =the standard temperature conversion factor, namely 1.0098;

P =the pressure conversion factor calculated in accordance with the provisions of Part I of the Schedule to these Regulations;

Z =the compressibility conversion factor calculated in accordance with Part II of that Schedule;

- (c) otherwise, is given by multiplying the temperature and pressure conversion factor by the volume of gas registered by the meter;

"the Director" means the Director General of Gas Supply;

"gas day" means a period of 24 hours beginning at 6am on one day and ending immediately before 6am on the following day;

"gas examiner" means a person appointed under section 13(1) of the Act;

"gas period" means one or more successive gas days;

"relevant licence holder", in relation to a public gas transporter, means—

- (a) another public gas transporter operating a pipe-line system to which gas is conveyed through pipes by the transporter; or

- (b) a gas shipper who has arranged with the transporter for gas to be introduced into, conveyed by means of or taken out of a pipe-line system operated by the transporter;

"take off point", in relation to a public gas transporter, means any premises to which gas is conveyed by the transporter or any point at which gas conveyed by the transporter enters any pipe-line system operated by another public gas transporter;

"temperature and pressure conversion factor", in relation to any meter for registering the volume of gas conveyed to a take off point, means—

- (a) where gas is conveyed to the meter at a rate which is reasonably expected not to exceed 25,000 therms or 732,000 kilowatt hours a year (if the conversion factor within the meaning of paragraph (b) below were applied), 1.02264; or

- (b) where gas is conveyed to the meter at a rate which is reasonably expected to exceed 25,000 therms or 732,000 kilowatt hours a year (if the conversion factor within the meaning of this paragraph were applied) the number given by the following formula, namely—

$$T \times P \times Z$$

where—

T =the standard temperature conversion factor, namely 1.0098;

P =the pressure conversion factor calculated in accordance with the provisions of Part I of the Schedule to these Regulations;

Z =the compressibility conversion factor calculated in accordance with Part II of that Schedule;

- (2) Any reference in these Regulations to the volume of gas registered by a meter shall, where the meter registers in cubic feet, be construed as a reference to the volume of gas so registered multiplied by 0.0283.
- (3) Except in the cases prescribed by paragraph (4) below, the number of therms or kilowatt hours conveyed by a public gas transporter to a take off point shall be calculated in accordance with Part II of these Regulations, or, where a public gas transporter makes or adopts a declaration of calorific value in accordance with regulation 8(1) below, Part III of these Regulations.

- (4) *The cases prescribed by this paragraph are the following cases, namely—*
- (a) *where—*
 - (i) *gas continues to be conveyed through a pipe to particular premises; and*
 - (ii) *the number of therms or kilowatt hours conveyed through that pipe to those premises was, immediately before the commencement of these Regulations, calculated on the basis of calorific values determined by means of apparatus provided and maintained only for purposes connected with the conveyance of gas through that pipe to those premises;*
 - (b) *where an agreement between a public gas transporter and a relevant licence holder or the owner or occupier of particular premises provides for the number of therms or kilowatt hours conveyed through a pipe to those premises to be calculated on the basis of calorific values determined by means of apparatus provided and maintained only for purposes connected with the conveyance of gas through that pipe to those premises.*
- (5) *Any reference in these Regulations to therms shall cease to have effect on 1st January 2000.*

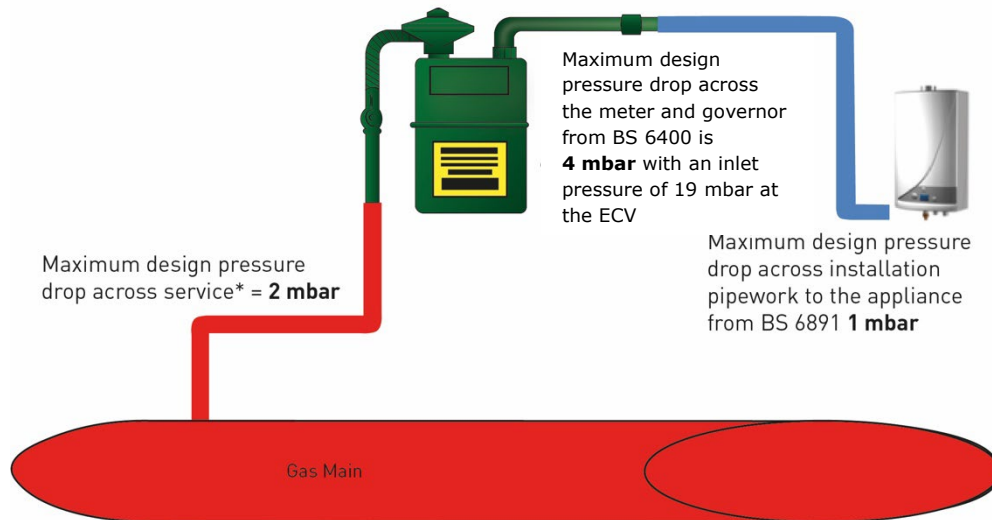
APPENDIX 4 : DESIGN OF LOW PRESSURE GAS SYSTEM

- A4.1 Design minimum pressures are included in Gas Distribution Networks’ (GDNs) and Independent Gas Transporters’ safety case and agreed by HSE (see Appendix 5).
- A4.2 The design of the low pressure supply system is shown in Figure 1 and Figure 2. The design of the system is such that the limits applied ensure the safety of those who work and operate it, and the consumers are kept safe.

NETWORK	METER INSTALLATION	INSTALLATION PIPEWORK	APPLIANCE(S)
Pressure at the ECV	Pressure at the outlet of the meter	Pressure at the inlet to the installation	Pressure at the inlet to the appliance
MIP _u 200 mbar	STP _{mi} 82.5 mbar	STP _c 82.5 mbar	
MOP _u 75 mbar	MIP _{mi} 75 mbar		OP _{max} 25 mbar
	PLOP _{mi} 25 mbar	MOP _c 25 mbar	OP _{nom} 20 mbar
LOP _u 25 mbar	MOP _{mi} 23 mbar		OP _{min} 17 mbar
DmP _u 19 mbar	LOP _{mi} 18 mbar	LOP _c 18 mbar	P _{ign} 14 mbar
	DmP _{mi} 15 mbar	DmP _c 15 mbar	

FIGURE 1 - LP GAS SYSTEM DESIGN PRESSURES

Commissioning requirements for domestic gas meters are taken from BS 6400 part 1.



**Note: Exceptionally a pressure drop of up to 5 mbar can be allowed if it can be shown by Network analysis that the pressure in the parent main is adequate and 18.5 mbar minimum pressure is achieved at the meter outlet.*

FIGURE 2 - DESIGN PRESSURE DROP ACROSS THE LP SUPPLY SYSTEM

A4.3 These design requirements are shown in the following industry Standards, as appropriate:

IGEM/TD/4	PE and steel gas services and service pipework
T/SP/NP/14/E	Specification for service pipes
BS 6400-1	Specification for installation, exchange, relocation, maintenance and removal of gas meters with a maximum capacity not exceeding 6 m ³ /h. Low pressure (2nd family gases)
BS 6891	Specification for the installation and maintenance of low pressure gas installation pipework of up to 35 mm (R1¼) on premises
IGEM/UP/2	Installation pipework on industrial and commercial premises
BS EN 437	Test gases - Test pressures - Appliance categories

This Standard defines the range of inlet pressures to be used for test purposes as follows:

- Normal inlet pressure (P_{nom}) **20 mbar**
- Maximum inlet pressure (P_{max}) **25 mbar**
- Minimum inlet pressure (P_{min}) **17 mbar.**

17.5 mbar is the lowest long-term pressure that an appliance Manufacturer would reasonably expect to be present at the inlet of a gas appliance whilst it is in operation. At this inlet pressure, all appliance Manufacturers have a responsibility of ensuring that their appliances operate safely and correctly.

A4.4 By design, the outlet of the meter installation is the point of common access to all parties and the pressure at this point is expected to be not less than 18.5 mbar and not exceeding 23 mbar under normal conditions.

APPENDIX 5 : GAS TRANSPORTER SAFETY CASE

A5.1 SAFETY CASE

A Safety Case has to be prepared by every Gas Transporter licensed to convey gas in Great Britain (GB) and in accordance with the requirements prescribed in the Gas Safety (Management) Regulations 1996 (GS(M)R). As a rule, each Safety Case will contain the information required by schedule one of the Regulations and the structure and content is based on HSE safety case guidance.

A5.1.1 Minimum Pressures

The Distribution Network utilises the following nominal minimum design pressures, in compliance with IGE/GL/1 for the design of its distribution systems and any subsequent diversions or ungoverned extensions to those systems.

These design pressures will be seen at the extremities under extreme conditions.

i. Systems and Extensions designed before January 1996:

6-minute time base - 19.00 mbar
Instantaneous time base - 12.50 mbar.

ii. Isolated distribution systems designed after December 1995:

6-minute time base - 20.75 mbar
Instantaneous time base - 14.25 mbar.

A5.1.2 Normal Pressures

The pressures given above are for nominal design conditions. However, for lower demand conditions, or away from the system extremities, the pressure at the customers control valve is expected to be at least 21.50 mbar measured on a 6 minute time base.

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