SAFE WORK WITH

GAS SYSTEMS & APPLIANCES

APPROVED CODE OF PRACTICE

Health & Safety at Work (Jersey) Law, 1989

Notice of Approval

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This Approved Code of Practice, ACoP 13 entitled "Safe Work with Gas Systems and Appliances" has been approved by the States of Jersey Minister for Social Security under Article 10 of the Health and Safety at Work (Jersey) Law, 1989, (the HSW Law).

This Code provides practical guidance for all persons who have duties under Part II of the Law and are involved with work on gas fittings and gas pipework.

ACoP 13

This Code of Practice which came into force on 1 February 2021 has been updated to reflect the adoption of the Gas Safe Registration scheme by the Government of Jersey

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Foreword

Any work with gas is potentially dangerous and the risks must be properly controlled. By its very nature gas is highly combustible. Leaks of gas from pipework or appliances can lead to fire and / or explosion creating a serious risk of harm to people and considerable property damage. In addition to the risk from gas leaking, faulty or poorly maintained gas appliances can lead to incomplete combustion of gas creating carbon monoxide, a colourless, odourless and poisonous gas which can, and does kill affected people each year.

This Approved Code of Practice (ACoP), gives practical guidance to those with duties under the *Health and Safety at Work (Jersey) Law 1989* when dealing with gas fittings and appliances. It has been produced in consultation with Jersey Gas, other relevant employers' and engineers. The Code of Practice has been approved by the Minister for Social Security under Article 10 of the Health and Safety at Work (Jersey) Law, 1989 (as amended).

This publication includes both the Approved Code of Practice (ACoP) and guidance issued by the Health and Safety Inspectorate. For ease of reference those parts of the document which are identified as part of the ACoP are printed in **bold** the remainder of the document comprises guidance on best practice.

Who should read this ACoP?

This ACoP is relevant for everyone with responsibility for work which may involve gas, for example employers, managers and individual engineers. It also applies to those in control of commercial and domestic properties that contain gas installations or construction sites where gas work is taking place. Others such as trade union health and safety representatives and health and safety professionals, may also find it useful.

The ACoP is based on and brings together authoritative guidance published by the UK Health and Safety Executive, Gas Safe Register and the Institution of Gas Engineers and Managers (IGEM)

Foreword

Legal Status of an ACoP

An ACoP has a special legal status. It gives practical advice on how to comply with the general duties imposed by the Health and Safety at Work (Jersey) Law 1989 (the Law). If you follow the advice you will be doing enough to comply with the Law in respect of those specific matters to which the ACoP refers. You may use alternative methods to those set out in the ACoP in order to comply with the law. However, the ACoP has a special legal status. If you are prosecuted for breach of health and safety law, and it is proved that you did not follow the relevant provisions of the ACoP, you will need to show that you have complied with the law in some other way or a Court will find you at fault.

The guidance is issued by the Health and Safety Inspectorate. Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and Safety Inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.

The Law

Employers and the self-employed have a duty under health and safety law to ensure, so far as is reasonably practicable, the health, safety and welfare of their employees and others who may be affected by their undertaking. The main legislation applying to work with gas is The Health and Safety at Work (Jersey) Law 1989.

The Health and Safety at Work (Jersey) Law, 1989

The Health and Safety at Work (Jersey) Law, 1989 provides for securing the health, safety and welfare of persons at work and for protecting others against risks to health or safety in connection with the activities of persons at work. The Law states, under Part II, the general duties of all persons involved with work activities.

Part II contains Articles 3 to 8. Article 3 sets out the employer's duty to his employees. This requires every employer to ensure, so far as is reasonably practicable, the health, safety and welfare of his employees. Article 3 (2) goes on to give examples of the extent of that duty and includes:

- *The identification and assessment of risks to health and safety to which the employer's employees are exposed at work.*
- *The provision and maintenance of plant and systems of work that are, so far as is reasonably practicable, safe and without risks to health.*
- *Arrangements for ensuring, so far as is reasonably practicable, safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances.*
- *The provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of his employees.*
- *So far as is reasonably practicable as regards any place of work under the employer's control, the maintenance of it in a condition that is safe and without risks to health and the provision and maintenance of access to and egress from it that are safe and without such risks.*
- *The provision and maintenance of a working environment for his employees that is, so far as is reasonably practicable, safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work.*

Article 5 requires employers to take into account the effect of their work on others, including the general public, children etc. The self-employed also have to take into consideration the manner in which they carry out their work in respect of both themselves and others.

Where others have control of premises used as a place of work, but do not have employees working on the premises, or possibly no employees at all, Article 6 places duties on them in respect of areas under their control.

Article 7 sets out the duties on designers, manufacturers, importers and suppliers. They must also play their part in ensuring health and safety issues are taken into account. This is an important area in ensuring that health and safety has been considered at the initial stages and continued through to the end user.

Finally, Article 8 requires that no person shall intentionally or recklessly interfere with, or misuse, anything provided in the interests of health, safety or welfare required by Law.

Introduction and Application

This Approved Code of Practice (ACoP) deals with the safe installation, maintenance and use of gas systems, including gas fittings, appliances and flues in domestic and commercial premises. The ACoP covers work with gas that is supplied for use as fuel for heating, cooking or lighting and includes gas supplied by mains in Jersey and LPG supplied in tanks and containers.

It does not include gases such as oxygen, acetylene etc. that are supplied for other reasons. Further information on the safe use of these type of gases is available in ACoP 3 *Safety of Pressure Systems and Transportable Gas Containers* published by the Health and Safety Inspectorate. A complete definition of gas relevant to this ACoP is provided in the definitions section below.

The ACoP does not cover mobile / portable appliances supplied by a gas canister such as camping stoves, hair tongs, blow lamps etc. but does cover a mobile space heater supplied by a cylinder. Nor does it cover the supply of gas to a vehicle as a means of propulsion such as LPG powered vehicles and fork-lift trucks. However where there are gas appliances contained within a vehicle that is used for commercial purposes such as: a mobile food vending vehicle or trailer; or a vehicle or caravan hired to the public in the course of a business; those fitting would fall within the scope of this ACoP.

The ACoP does not apply in relation to a gas fitting used for the purpose of training gas engineers in a college, other training establishment or an assessment centre. These fittings may have deliberately induced faults in appliances for the purposes of training and assessment. The person providing such training or assessment must be competent to provide that training or assessment as required by this ACoP.

The over-riding principle of the ACoP is that only those persons that are competent to carry out work on gas fittings and gas appliances carry out work and that work should be carried out safely and in accordance with the relevant standards. Competence is a mixture of training and experience and should be evidenced by completion of a relevant Approved Certification Scheme (ACS) for gas work and registration with the approved body, which is currently Gas Safe Register.

Definitions used in this ACoP

Gas

Gas, for the purposes of this ACoP, is defined as methane, ethane, propane, butane, hydrogen or carbon monoxide; a mixture of two or more of these gases; and a combustible mixture of one or more of these gases and air. The physical form of these substances is not material as both liquid and gaseous phases are included in the ACoP.

Gas appliance

An appliance designed for use by a consumer of gas for heating, lighting, cooking or other purpose for which gas can be used. It does not include a portable or mobile appliance supplied with gas from a cartridge that is non-refillable such as a camping stove, blow lamp, hair straightener etc. but would include a mobile or portable space heater that is supplied via a cylinder

Gas fitting

"Gas fitting" means gas pipework, valves (other than emergency controls), regulators and meters, and fittings, apparatus and appliances designed for use by consumers of gas for heating, lighting, cooking or other purposes for which gas can be used. It does not mean:

- any part of a service pipe (e.g. as in a network supplying mains gas);
- any part of a distribution main or other pipe upstream of the service pipe;
- a gas storage vessel; or
- a gas cylinder or cartridge designed to be disposed of when empty.

Gas storage vessel

For the purpose of this ACoP "gas storage vessel" means any storage container designed to be filled or re-filled with gas at the place where it is connected for use or a re-fillable cylinder designed to store gas, and includes the vapour valve; but does not include a cylinder or cartridge designed to be disposed of when empty.

Gas 'work'

"Work" in relation to a gas fitting includes any of the following activities carried out by any person, whether an employee or not, that is to say:

- installing or re-connecting the fitting;
- maintain, servicing, permanently adjusting, disconnecting, repairing, altering or renewing the fitting or purging it of air or gas;
- where the fitting is not readily moveable, changing its position; and
- removing the fitting;

but the expression does not include the disconnection or connection of a bayonet fitting or other self-sealing connector. Similarly 'disconnection' of a gas fitting does not mean isolation by means of a valve etc. but refers to detaching or uncoupling a fitting (i.e. which involves breaking into a gasway).

Work in relation to a control device on a gas appliance that does not involve breaking into a gasway and is primarily for use by the consumer of gas does also not constitute 'gas work' covered by this ACoP.

The definition of "work" above cannot be exhaustive and other operations may constitute work in relation to gas fittings. The definition is intended to be wide ranging and encompass any activities that are subject to the Health and Safety Law that in any way affect the safety of a gas fitting (whether new or existing).

Appropriate fitting

The use of an 'appropriate fitting' is required in certain parts of this ACoP for sealing off a gasway (i.e. a passage through which gas may pass) in order to prevent escape of gas. Any such fitting should be designed for the purpose (i.e. not improvised from whatever is at hand, such as a fitting intended to seal other pipework, e.g. water pipes), and should comply with the appropriate standards. For instance, suitable screw-in or soldered fittings should be used which securely blank or cap-off open ends of pipe or incomplete gasways in appliances.

Premises

This ACoP shall apply in all premises as defined in *The Health and Safety at Work (Jersey) Law 1989* where persons are at work as defined in the Law.

Competence to Work with Gas

1 **No person should carry out work in relation to a gas fitting or gas storage vessel unless they are competent to do so. Gas work should only be undertaken by a person who has successfully completed an industry recognised training course followed by assessment of competence; or in the case of a currently registered person, where they have proved competence through a certification scheme.**

2 **Without prejudice to the paragraph above, no employer should allow any of his employees to carry out any work in relation to a gas fitting or service pipework and no self-employed person shall carry out any such work unless the employer or self-employed person, as the case may be, is a member of a class of persons approved by the Health and Safety Executive of the UK to carry out gas work.**

3 At the time of publication of this *Approved Code of Practice (ACoP)*, the only body with such approval is the Gas Safe Register (www.gassaferegister.co.uk). Should the registration body appointed by the Health and Safety Executive change in the future, employers and the self-employed should be registered with the body approved by the Health and Safety Executive at that time.

4 This ACoP is specific in its requirement that gas work should only be carried out by those that are competent to do so. It is not acceptable for a Gas Safe registered engineer to knowingly "sign-off" gas work that has been carried out by a person that is not registered in order to circumvent the requirements of the ACoP. While a non-registered person may carry out "wet work" i.e. install water pipes and radiators for a heating system, any work on the gas boiler itself and the final connection of the water pipework is gas work as defined in this ACoP and must be carried out by a Gas Safe registered engineer. *Gas Safe Register Technical Bulletin TB 14 "Gas Work"* provides further guidance to registered engineers asked to commission gas installation work carried out by others.

5 Training that leads to assessment of competence in safe gas work should be recognised by the industry's standards setting body. The certification scheme for gas engineers requires individual gas engineers to have their competence assessed at regular intervals under specific scheme arrangements set by the standards setting authority, operated by a certification body and currently accredited by the *United Kingdom Accreditation Service (UKAS)*.

6 Further guidance both on the scope of training and the need for proper assessment / reassessment for gas engineers can be found in the industry guidance *'Standards of training in gas work'.* Information on the scope of work a Gas Safe Registered engineer is competent to perform may be obtained from the engineer's certificate of competence (issued under the certification scheme or from Gas Safe Register).

7 Gas engineers who are employed by an organisation that is a member of a class of persons approved to carry out gas work described above but who do separate work on their own behalf need to be in membership i.e. be Gas Safe registered in their own right.

8 As gas storage vessels are not 'gas fittings' as defined in this ACoP, changing cylinders, filling storage tanks or fixing tanks in position does not require membership of an approved class of persons i.e. Gas Safe Registration. Nor does the replacement of a hose or regulator on a portable or mobile appliance; or the replacement of a hose connecting a refillable cylinder to installation pipework; on a like-for-like basis, require registration. However, persons carrying out this work should have the necessary competence and ensure that they follow the instructions given by the gas supplier / manufacturer as appropriate.

9 Where other work is involved installing or replacing an LPG tank involving work on service pipework or other gas fittings, it should only be carried out by a Gas Safe registered engineer with the correct competence.

Duties on Specific Persons

10 **Where an employer or self-employed person requires any work in relation to a gas fitting to be carried out at any place of work under his control, or where an employer or self-employed person has control to any extent of work in relation to a gas fitting, he should take reasonable steps to ensure that the person undertaking that work is, or is employed by, a member of a class of persons approved by the Health and Safety Executive.**

11 Businesses should make reasonable efforts to obtain evidence that any person they intend to perform gas work either under contract or on their behalf is a member of a class of persons authorised to carry out such work. At the time of publication of this ACoP this means they should check that contractors are Gas Safe registered. Gas Safe Register will provide evidence of registration and confirmation that any certificate of registration is still valid on-line (www.gassaferegister.co.uk).

12 **Employers of gas engineers should ensure that their employees have the required competence for the work undertaken. This will involve ensuring they are properly experienced and trained and involve ongoing monitoring of performance standards as necessary.**

13 Competence is a combination of practical skill, training, knowledge and experience to carry out the job in hand safely, and ensuring the installation is left in a safe condition for use. Knowledge must be kept up to date with changes in the law, technology and safe working practices.

14 **Every employer or self-employed person should ensure that any gas appliance, installation pipework or flue installed at any place of work under his control is maintained in a safe condition so as to prevent risk of injury to any person.**

15 All employers and the self-employed that operate an undertaking that uses gas and gas appliances in the course of their business should be aware of their duty to maintain those gas appliances, installation pipework and flues in a safe condition. The duty will cover appliances in a wide range of premises, for example: shops, offices, commercial kitchens, restaurants, public premises, boats made available to the public in the course of a business and mobile food stalls (whether towed or self-propelled).

16 The duty to maintain appliances, installation pipework and flues is linked to the other general responsibilities placed on dutyholders under the Health and Safety at Work (Jersey) Law 1989. Effective maintenance of appliances usually involves an ongoing programme of regular/periodic inspections, together with any necessary remedial work. In the absence of specific manufacturer's instructions, effective maintenance should include examination of the physical condition and safe functioning of appliances, installation pipework, ventilation and flues; carrying out performance tests; and completing any remedial action necessary.

17 Other employers and the self-employed that do not have gas appliances and fittings under their direct control may carry out work in, or on premises that have gas fittings whose safe operation could be compromised by their work. For example builders or roofing contractors may carry out work on a premises that comprises the integrity and safe operation of a flue fitted to a gas appliance or window fitters may install new windows and doors that affect the ventilation, and safe operation of an appliance. Further information is provided in the section headed "Existing Gas Fittings" of this ACoP.

18 **An employer or self-employed person must not use or allow the use of any appliance which it is known or suspected could constitute a danger to any person at any place of work under his control. In particular, danger of fire/explosion resulting from the leakage of gas or carbon monoxide poisoning arising from inadequate flueing arrangements or fixed ventilation.**

19 General examples of the kind of unsafe/dangerous appliances which, if likely to cause death or serious injury, would be regarded as an 'unsafe' appliance, are given in *The Gas Industry Unsafe Situations Procedure.* However the level of risk (i.e. whether an appliance is 'dangerous' in a particular case) has to be a matter for the judgement of a competent person, based on their experience and knowledge and taking into account the specific circumstances.

Landlords

20 Landlords of commercial premises may have duties to maintain gas appliances, installation pipework and flues on those premises in a safe condition, as a person with a "place of work under his control" as referred to above under duties of employers and the self-employed.

21 This ACoP does not apply any duty to landlords of domestic properties. However, under the Public Health and Safety (Rented Dwellings – Minimum Standards and Prescribed Hazards) (Jersey) Order 2018, landlords are required to have an annual gas safety inspection of the dwelling carried out by a Gas Safe registered engineer. The duty applies where there is a gas supply to the dwelling, whether or not any appliances are connected to that supply.

Materials and Workmanship

22 **A gas fitting should not be installed unless every part of it is of good construction and sound material, of adequate strength and size to secure safety and of a type appropriate for the gas with which it is to be used.**

23 **Gas engineers should acquaint themselves with the appropriate standards for gas fittings and ensure that the fittings they use are to those standards.**

24 Most new gas appliances used for domestic and commercial purposes will carry CE marking, a European Standard mark and / or a BSI kitemark. Pipes should be of suitable construction, material, strength and size to convey gas to the appliance and to ensure its safe operation. This ACoP makes reference to 'appropriate fittings'. Any such fitting should be designed for the purpose and not improvised from what is available (for example, pipework and fitting designed for use with water should not be used with gas).

25 **No person should install in a building any pipe or pipe fitting for use in the supply of gas which is made of lead or lead alloy; or made of a non-metallic substance; unless it is a pipe connected to readily movable appliance without a flue. Non-metallic connectors for use with readily movable gas appliances should conform to the appropriate standard. Such hoses, pipes and pipe fittings must only be used for the purpose for which they were designed.**

26 Appliances or meters may be connected to existing lead piping using suitable fittings, provided that the piping is in a safe condition, e.g. there is no sign of damage.

27 Free standing gas cookers are generally moveable but are not regarded as 'readily movable' under this requirement of the ACoP. Flexible cooker hoses should therefore be of metallic construction; they should conform to appropriate standards and be used only for their intended purpose.

28 **No person should install a non-metallic gas pipe unless the part entering a building and that part of it within the building is placed inside a metallic sheath which is so constructed and installed as to prevent, as far as is reasonably practicable, the escape of gas into the building if the pipe should fail.**

29 This does not preclude the use of polyethylene (PE) piping buried in ground beneath a building provided that the piping does not enter the building. However it does include piping routed in spaces beneath floors.

30 **In any case where it is necessary to prevent danger, no person should carry out work in relation to a gas fitting without using a suitable bond to maintain electrical continuity until the work is completed and permanent electrical continuity has been restored. A temporary continuity bond to the appropriate standard is required when disconnecting and reconnecting pipework where the production of a spark could cause a hazard.**

31 The purpose of the temporary bond is to maintain electrical continuity between the pipework to reduce the risk of a spark causing ignition. Work is not considered to have been completed until permanent continuity has been restored where this is necessary to prevent potential hazard. The bond should be fitted with a robust clip or clamp at each end which provides effective electrical contact.

32 The *Gas Industry Unsafe Situations Procedure* provides details of situations that may present a danger (such as gas leaks and incomplete combustion of gas etc). In Great Britain (England, Scotland and Wales) the RIDDOR regulations require gas businesses / engineers to report any gas fittings (including appliances and flues or ventilation used with appliances) that they believe to be dangerous. There are no reporting regulations in Jersey, however gas businesses and engineers are encouraged to voluntarily report matters of concern such as these to the Health and Safety Inspectorate (HSI) via e-mail at hsi@gov.je. If a gas leak is suspected, Jersey Gas should be notified immediately on 755555 (24hr emergency service).

General Safety Precautions

33 **No person should carry out any work in relation to a gas fitting in such a manner that gas could be released unless steps are taken to prevent the gas so released constituting a danger to any person.**

34 **No person carrying out work in relation to a gas fitting should leave the fitting unattended unless every incomplete gasway has been sealed with an appropriate fitting or the gas fitting is otherwise safe. An appropriate fitting used to seal appliance gasways should ensure that the gas supply cannot be readily restored until safe to do so. Closure of an emergency control does not fulfil this requirement.**

35 This requirement generally covers work on existing gas fittings that involves breaking into the live gasway. If the work has to be left unfinished for any period – during which appliances might be inadvertently or deliberately used – the gas supply to the (disconnected) appliance should be sealed as required above. 'Unattended' would normally mean that the person working on the gas system is absent from the premises for a significant time during which time someone could turn the supply back on to use the appliance. On a larger commercial premises 'unattended' could mean being on another part of the site.

36 **The open end(s) of any metal pipe(s) from which a gas fitting has been disconnected should be sealed with an appropriate metal fitting.**

37 This requirement is largely intended to deal with situations in which gas appliances are being removed, for instance when they are no longer need or are being taken away when owners move home. When an appliance is disconnected and open-ended pipework is left, the pipework should be left sealed with an appropriate fitting (as defined at the start of this ACoP).

38 **No person carrying out work in relation to a gas fitting which involves exposing gasways which contain or have contained flammable gas should smoke or use any source of ignition in such a manner as may lead to a risk of fire or explosion.**

39 **No person searching for an escape of gas should use any source of ignition.**

40 'Source of ignition' includes tools such as blow-lamps and hot-air guns. A safe system of work (including effective isolation of the gas supply etc.) should be used to avoid any risk of fire or explosion. Gasways should generally be purged before using tools such as blow-lamps.

41 The source of leaks should be located by sense of smell, gas detection instruments approved for use in flammable atmospheres, leak detection fluids, pressure test equipment or a combination of these methods.

42 **Where a person carries out any work in relation to a gas fitting which might affect the gas tightness of the gas installation he shall immediately thereafter test the installation for gas tightness at least as far as the nearest valves upstream and downstream in the installation in accordance with the appropriate standard.**

43 **No person shall install a gas storage vessel unless the site where it is to be installed is such as to ensure that the gas vessel can be used, filled and refilled without causing a danger to any person.**

44 **No person shall intentionally or recklessly interfere with a gas storage vessel or otherwise do anything which might affect a gas storage vessel so that the subsequent use of that vessel might cause a danger to any person.**

45 Persons involved in the importation, storage and handling of LPG in bulk and in cylinders should also be aware of the content of the *Safeguarding of Workers (Liquefied Petroleum Gas) (Jersey) Regulations 1984* and associated guidance published by the Health and Safety Inspectorate. Guidance on the installation of LPG vessels is given in *UKLPG Codes of Practice* (www.liquidgasuk.org)

46 **A gas storage vessel or an appliance fuelled by LPG which has an automatic ignition device or a pilot light should not be installed in a cellar or basement.**

47 The requirement above addresses the fire / explosion hazard presented by the possible leakage and accumulation of heavy LPG vapour in any basement or cellar or from the involvement of a gas storage vessel in a building fire. Guidance on the installation of LPG vessels is given in *UKLPG Codes of Practice* (www.liquidgasuk.org)

Protection of Gas Fittings

48 **Any person installing a gas fitting should ensure that it is properly supported and so placed or protected as to avoid any undue risk of damage to the fitting. Gas fittings should be installed in accordance with appropriate standards.**

49 Gas fittings should be properly supported to ensure there is no undue strain on them which could lead to failure or damage of the fitting. Gas fittings should be installed, as far as possible, in a position which avoids any damage from foreseeable activities in the vicinity e.g. traffic. Where such risk cannot be avoided, fittings should be suitably protected against possible damage.

50 **No person should install a gas fitting if he has reason to suspect that foreign matter may block or otherwise interfere with the safe operation of the fitting unless he has fitted to the gas inlet of, and any airway in, the fitting a suitable filter or other suitable protection.**

51 **No person should install a gas fitting in a position where it is likely to be exposed to any substance which may corrode gas fittings unless the fitting is constructed of materials which are inherently resistant to being so corroded or it is suitably protected against being so corroded.**

52 Environments of particular concern are those where water, salt-spray, damp, corrosive chemicals or soot are present, or likely to be present. Special care needs to be taken where a gas fitting is located in a movable structure such as a boat, or a caravan on coastal sites. In some circumstances, it may be necessary to apply a protective coating but that coating should not affect safe operation of the fitting.

Existing Gas Fittings

53 **No person should make any alteration to any premises in which a gas fitting or gas storage vessel is fitted if that alteration would adversely affect the safety of the fitting or vessel.**

54 This requirement applies to developers, builders, contractors and other persons at work that make alterations to premises in which a gas fitting is already installed which could compromise gas safety. The implications of any change to premises for safety of a gas fitting or gas storage vessel need to be considered systematically as part of the overall work planning process.

55 This requirement embraces a wide range of physical alterations to premises that might affect the safety of a gas fitting or gas storage vessel installed in the premises where the alteration is to be made. Before alteration to premises where a gas appliance is installed (e.g. installation or removal of windows, air-bricks or extractor fans etc.) any implications for gas appliance safety should be properly assessed. Similarly the possible effects of any modification on the safety of gas storage vessels should also be considered. For example the effects on a building extension reducing the separation distance or ventilation to a gas storage vessel or placing strain on buried gas services.

56 The requirements of the *Building Bye-Laws (Jersey) 2007* concerning ventilation and flues for gas fired appliances in *Technical Guidance Document Part 3 Combustion Appliances and Fuel Storage Systems* should be taken into account.

57 In some cases the effects of particular building work on gas safety may be obvious. For example where a chimney is reduced in height or capped its effectiveness in removing flue gases will be drastically reduced. Before such work is started, it needs to be established if the chimney is active, and if so allowance made for this in the way the work is carried out. Similar consideration needs to be given to any proposed alterations which might affect the operation of a flue system e.g. fitting a flue liner or terminal.

58 In other cases the effects of the work may not be so obvious. For example, when fitting double glazing or cavity wall insulation, the removal of fixed permanent ventilation, such as air bricks or blockage of vents by insulation, can lead to danger from insufficient ventilation of appliances and incomplete combustion. Equally the fitting of extractor fans can lead to the pull on flues being overcome and flue products being sucked back into premises. Moreover, the enclosure of an existing flue terminal within a new extension or conservatory can lead to flue gases being trapped.

59 Irrespective of how obvious the implications of the work are for gas safety, the people involved need to keep these matters in mind and ensure they are properly addressed when alteration to premises are planned. If there is any doubt a competent gas engineer should be approached for advice.

60 **No person should do anything which would affect a gas fitting or any flue or means of ventilation used in connection with the fitting in such a manner that the subsequent use of the fitting might constitute a danger to any person.**

61 This requirement does not apply to modification of the premises but prohibits other activities which could affect the safe operation of gas fittings or flues. This might include, for example, work which blocks or obstructs an air supply vent or a flue which is not directly connected to an alteration to premises.

62 **Modification of a gas fitting should only be made by a Gas Safe registered engineer.**

63 Alterations not comprising 'work' on a gas fitting but which nevertheless may affect gas safety should be made by a competent person. Similarly any significant modification needs to be checked by a competent person before the gas fitting concerned is taken back into service to ensure that appropriate standards have been met and safety has not been compromised.

Emergency Controls

64 **No person should for the first time enable gas to be supplied for use in any premises unless there is provided an appropriately sited emergency control to which there is adequate access.**

65 Whenever a new gas supply is made available for use in premises, an emergency control should also be provided. Where there is a gas meter, the meter control may serve as the emergency control as long as the following conditions are met:

a) Each individual premises (e.g. each house, flat, maisonette or caravan) using a supply of gas should be provided with an emergency control, whether or not those premises contain a gas meter;

b) The emergency control should be situated as near as is reasonably practicable to the point where the gas supply enters the premises;

c) It should be readily accessible to all consumers, i.e. gas users in the premises concerned (e.g. not located in a basement or cellar);

d) A valve located in a meter room that is normally locked, and accessible only to a landlord, gas supplier or emergency services, for example, cannot act as an 'emergency control';

e) An emergency control should be protected from unauthorised operation, (i.e. tamper proof) but if located in a locked compartment, the occupier(s) of the premises should have keys.

66 The person allowing the flow of gas to the premises should ensure that every gas consumer in the premises is aware of the location of their emergency control, and the action to be taken in a gas emergency. Where there is more than one emergency control e.g. in multi occupancy premises, it is important for the particular control serving that consumer to be identified. In the case of rented properties the responsible person for the building e.g. landlord or managing agent, should ensure that all tenants are made aware of this information.

67 In the case of LPG, this requirement only applies where the gas is supplied from a storage tank or tanks, or from two or more cylinders connected by an automatic changeover device. In other cases the vapour valve on each cylinder functions as a shut-off control and no additional provision is necessary.

68 The emergency control can operate by a key, lever or hand wheel which should be securely attached to the operating spindle. Where a key or lever is used, the 'open' position should be when the key or lever is parallel to the axis of the pipe. The 'off' position should be approximately one quarter turn of the key or lever to the right or left, and where the key or lever moves in the vertical plane, the move to the 'off' position should be in a downward direction. Either the key or lever itself, or a nearby permanent notice, should indicate how the control operates and when the gas is 'off' and 'on'.

69 Where a person installs an emergency control which is not adjacent to a primary meter, he shall immediately thereafter prominently display on or near the means of operating the control a suitably worded notice in permanent form indicating the procedure to be followed in the event of an escape of gas.

70 The notice displayed at the gas emergency control should be durable, protected against damage and needs to tell the consumer:

a) to shut off the supply of gas if there is a gas escape in the premises; and

b) if gas continues to escape, immediately notify Jersey Gas / Kosangas using the 24-hour emergency line on 755555; and

c) to ventilate the premises and to extinguish all sources of ignition; and

d) not to reinstate the supply until remedial action has been taken by a competent person to prevent gas escaping again.

Meters and Meter Housings

71 **Before any meter is installed, a check should be made that the means of escape from the premises in the event of a fire is not, as far as is reasonably practicable, adversely affected. Any meter installed in premises should be of sound construction and in the event of a fire, gas should not be able to escape in hazardous quantities.**

72 New meters should not be installed on or under the stairway or in any other part of a premises with two or more floors above ground, where the stairway or that other part of the premises forms the sole means of escape in the event of a fire.

73 Where new meters and replacement meters are to be installed in any premises (including premises with less than two floors above the ground) they should be installed, as far as is reasonably practicable, in accordance with the guidance above. If it is necessary to install a meter on or under a stairway or in any other part of the premises where the stairway or that other part of the premises forms the sole means of escape in the case of fire, then:

a) the meter should be fire resistant; or

b) the meter should be housed in a fire-resistant compartment with automatic self-closing doors; or

c) the pipe immediately upstream of the meter, or regulator if fitted, should be provided with a thermal cut-off device which is designed to automatically cut off the gas supply if the temperature of the device exceeds 95ºC.

Due account should also be taken of any relevant requirements in the *Building Bye Laws (Jersey).*

74 **Meters should only be installed in a location that ensures that the necessary separation distance between the gas meter installation and the electrical apparatus (as specified in the appropriate standards) are maintained.**

75 **Meters should be installed in a readily accessible position for inspection and maintenance. Where a meter has bosses or side pipes attached to the meter by a soldered joint only, rigid pipe connections should not be made to the meter.**

76 **A prepayment meter should not be installed as a primary meter through which gas passes to a secondary meter as the supply to all consumers could be cut when the prepayment credit runs out. This would lead to a potential risk of gas escape where an appliance has not been isolated before the gas supply is turned back on.**

77 **Any person supplying or permitting the supply of gas through a primary meter to a secondary meter should ensure that a line diagram in permanent form is prominently displayed on or near the primary meter or gas storage vessel and on or near all emergency controls connected to the primary meter showing the configuration of meters, installation pipework and emergency controls. If the configuration is changed so that the accuracy of the line diagram is affected, it should be amended so as to show the altered configuration.**

78 This information would be required by the emergency services or a gas engineer in cases such as houses of multiple occupancy or blocks of flats where a particular dwelling was to be isolated without affecting the other occupants. The situation may be further complicated in 'sub-deduct' situations where secondary meters are used to establish charges to downstream consumers by a process of deduction from a total quantity of gas supplied through a primary meter. The duty to provide the notice could be incumbent on the gas supplier (Jersey Gas) or the person permitting the supply of gas i.e. the landlord.

79 **Where a person installs a meter and the pipes and other gas fittings associated with it, the connections should be immediately thereafter tested for gas tightness in accordance with the appropriate standard. The whole installation should then be purged including any appliances connected to the system, again in accordance with the appropriate standard.**

80 **Where a meter is housed in a meter box or meter compound attached to or built into the external face of the outside wall of any premises, the meter box or meter compound should be so constructed and installed that any gas escaping within the box or compound cannot enter the premises or any cavity in the wall but must disperse to the external air.**

81 Potential routes for gas leakage from a meter box or compound into a premises or wall cavity should be effectively sealed. Particular care needs to be taken to adequately sleeve and seal around any cable or installation pipe where it passes from the meter box and enters a building, e.g. via a cavity.

82 If a meter is installed in meter box with a key or meter compound that is secured, the consumer should be provided with a key for that meter box or compound.

83 Readily combustible materials should not be knowingly stored in a meter box or meter compound.

84 Where a meter is removed and not re-installed or replaced with another meter, the gas supplier should;

a) close any service valve which controlled the supply of gas to the meter;

b) seal the outlet of the emergency control with an appropriate fitting; and

c) clearly mark any live gas pipes in the premises in which the meter was installed to the effect that pipe contains gas.

85 Where the meter has not been re-installed or replaced by another meter before the expiry of the period of 12 months beginning on the date of the removal of the meter and there is no such service valve as mentioned above; the supplier should ensure the service pipe for the premises is disconnected as near as is reasonably practicable to the main or storage vessel and that any part of the pipe or pipework which is not removed is sealed at both ends with the appropriate fitting.

Regulators

86 **A primary meter or a meter bypass used in connection with a primary meter should not be installed unless:**

a) **there is a regulator controlling the pressure of gas supplied through the meter or the bypass, 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 is also adequate 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.**

87 **Gas should not be supplied from a gas storage vessel (other than a re-fillable cylinder or a cylinder or cartridge designed to be disposed of when empty) to any service pipework or gas fitting unless:**

a) **there is a regulator installed which controls the nominal operating pressure of the gas;**

b) **there is adequate automatic means for preventing the installation pipework and gas fitting downstream of the regulator from being subjected to a pressure different from that for which they were designed; and**

c) **there is an adequate alternative automatic means for preventing the service pipework from being subjected to a greater pressure than that for which it was designed should the regulator referred to in sub para (a) above fail.**

88 The requirement above applies only to installations using gas (essentially LPG) stored in bulk vessels or tanks. Any such installation should be provided with:

a) a regulator to maintain the gas supply pressure within the range at which appliances downstream were designed to operate safely; and

b) an over-pressure and under-pressure shut-off device (OPSO/UPSO) to provide back-up protection if the regulator fails or the gas supply pressure falls to a dangerously low level, e.g. because the storage vessel has become empty.

89 **Gas should not be supplied through an installation consisting of one or more refillable cylinders unless the supply of gas passes through a regulator which controls the nominal operating pressure of the gas. Gas should not be supplied through an installation consisting of four or more refillable cylinders connected to an automatic change-over device unless there is an adequate alternative automatic means for preventing the service pipework and any gas fitting downstream of the regulator from being subjected to a greater pressure than that for which it was designed should the regulator fail.**

90 As with installations using bulk tanks a regulator should be provided to maintain the gas supply pressure within the range at which appliances downstream were designed to operate safely. It is recommended that all fixed pipework cylinder installations have an over-pressure protection device fitted to prevent downstream appliances, pipework and fittings being subjected to a pressure above that for which they are designed.

91 **Where a regulator is installed for controlling the pressure of gas through a primary meter; a meter bypass used in connection with a primary meter; or from a gas storage vessel, the regulator shall be adequately sealed so as to prevent its setting being altered without breaking the seal. No person other than the gas supplier or a person authorised to act on his behalf shall break the seal. Where a gas appliance is itself fitted with a regulator, this should similarly be sealed but may be altered by a competent person without the need for authorisation. The person who breaks the seal in either case should apply a new seal as soon as practicable to prevent the setting of the regulator being interfered with without breaking the seal.**

Installation Pipework

92 **Pipework should not be installed in any position in which it cannot be used with safety, having regard to the position of other pipes, pipe supports, drains, sewers, cables, conduits and electrical appliances and to parts of the structure of any premises in which it is installed which might affect its safe use. The location and routing of pipework should take into account the potential risk of other building services, equipment and features.**

93 **Any person who connects installation pipework to a primary meter should, in any case where equipotential bonding may be necessary, inform the responsible person that such bonding should be carried out by a competent person.**

94 Main equipotential bonding (MEB) is the connection between the consumer earth point and the gas installation pipe. The purpose is to create a zone (i.e. within a building) including the area occupied by the gas installation pipework, within which acceptable voltage differences are maintained to avoid the risk of electric shock.

95 The person who installs a section of pipework which connects with (or will connect with) the primary meter or emergency control valve must inform the responsible person for the premises (builder, owner or occupier) of the possible need for MEB where such a requirement did not exist before the installation. Such bonding should be carried out by a competent person. Although this situation normally arises during installation or modification of systems, similar action should be taken where an engineer notices an apparent defect in bonding in other circumstances.

96 **Pipework should not be installed in a wall, or a floor or standing of solid construction unless it is so constructed and installed as to be protected against failure caused by movement of the wall, the floor or the standing, as the case may be.**

97 **Pipework should not be installed so as to pass through a wall or a floor or standing of solid construction (whether or not it contains any cavity) from one side to the other unless; the pipe takes the shortest possible route practicable within the wall, floor or standing;**

and adequate means are provided to prevent, as far as is reasonably practicable, any escape of gas from the pipework passing through the wall, floor or standing entering any cavity in the wall, floor or standing.

98 These requirements are to address the potential risk of gas leaking into a cavity within a wall, floor or standing. Such leakage may be difficult to detect and readily lead to the accumulation of an explosive gas/air mixture in the cavity. The protective measures may include enclosing that part of the pipe that passes through the floor, wall or standing in a gas tight sleeve which is itself ventilated to a safe position, preferably open air.

99 **Pipework should not be installed in a cavity in a wall unless the pipe is to pass through the wall from one side to the other. The only exception to this requirement is in the case of pipework connected to a living flame effect gas fire; provided that that the pipework in the cavity is as short as is reasonably practicable and is enclosed in a gas tight sleeve and sealed at the joint at which the pipework enters the fire.**

100 The exception for living flame effect gas fires applies only to those fires of this type that are designed to operate with a fanned flue system and are installed within the inner leaf of a cavity wall. Pipework runs within the cavity must be as short as is reasonably practicable.

101 **Pipework should not be installed under the foundations of a building or in the ground under the base of a wall or footings unless steps are taken to prevent damage to the pipework in the event of movement of the structures or the ground.**

102 **Pipework should not be installed in a way which would impair the structure of a building or impair the fire resistance of any part of its structure.**

103 **Pipework shall not be installed in any shaft, duct or void which is not adequately ventilated.**

104 Shafts, ducts and voids used for accommodation of gas pipework should comply with the appropriate standard. It should be ensured that measures to comply with void/duct ventilation arrangements, do not impair any provisions for fire/smoke separation in a building.

105 Where work has been carried out in relation to any installation pipework that may affect the gas tightness of any part of it, the person carrying out that work should immediately thereafter ensure that joints are inspected to ensure that they been correctly made and that the part is adequately tested to ensure that it is gastight and has been installed in accordance with the relevant standards.

106 Gas tightness requirements are set out in the appropriate standard.

107 Joints should be examined and tested before any necessary protective coating is applied.

108 After any work which breaches the installation pipework integrity, the person carrying out the gas tightness test described above should ensure purging is carried out through all of the installation pipework through which gas can flow so as to safely remove all gas and air other than the gas to be supplied. If the pipework is not to be put into immediate use it should be sealed at every outlet using an appropriate fitting. If such purging has been carried out through a loosened connection it should be re-tested for gas tightness after it has been re-tightened. Where seals have been fitted these should be tested for gas tightness.

109 Where gas is not being supplied to a premises where installation pipework has been installed, gas should not be permitted to pass into the installation pipework until such purging and testing has been carried out. When the supply is connected, the person connecting the supply will be responsible for such purging and testing of the installation pipework.

110 Installation pipework that is installed in premises other than domestic or living accommodation which is accessible for inspection should be permanently marked as part of a pipe for conveying gas. The responsible person for the building should ensure that the markings continue to be recognisable so long as the pipe is used for the conveyance of gas.

Gas Appliances

111 **No gas appliance shall be installed unless it can be used without constituting a danger to any person. Gas engineers should ensure that any appliance they install, or flue to which they connect an appliance, is safe for use. Checks should be made to ensure that the appliance is safe to use as applicable and with reference made to the manufacturers' instructions and appropriate standards.**

112 This requirement places an important and wide ranging duty on the engineer to ensure that nothing about the appliance or the manner in which it is installed, any fitting or flue, or other factor (e.g. ventilation) will cause danger when the appliance is taken into service. Appendix 2 provides details of appropriate tests and examinations that should be carried out. A list of appropriate standards and guidance can be found on the Gas Safe Register website in the *Legislative, normative and informative document list* at www.gassaferegister.co.uk

113 **The appliance should not be left connected to the gas supply unless it can be used safely; or it is sealed from the gas supply with an appropriate fitting.**

114 **A gas appliance should be installed in a manner that it is readily accessible for operation, inspection and maintenance.**

115 Minimum clearance distances for operation, inspection and maintenance purposes are normally specified in manufacturers' instructions for the installation of appliances.

116 **A flued domestic gas appliance should not be connected to the gas supply system except by a permanently fixed rigid pipe to prevent consumers moving the appliance away from the flue.**

117 **The physical condition of a used appliance should be checked before installation to verify that it is safe for use as suitable inspection may not be possible following installation.**

118 **A suspended gas appliance should not be installed unless the installation pipework to which it is connected is so constructed and installed as to be capable of safely supporting the weight imposed on it and the appliance is designed to be so supported.**

119 **A gas appliance should not be installed without there being at the inlet to it, means of shutting off the gas supply to the appliance, unless the provision of such means is not reasonably practicable.**

120 The means of shutting off the gas supply to an appliance may comprise either a conventional isolation valve or other effective means e.g. a self-sealing plug in connector (commonly used in cooker installations) or a screw-down restrictor elbow (such as used on gas fire installations). A shut-off device at the inlet to a gas appliance is considered as part of 'installation pipework' for the purposes of this ACoP and assists tightness testing of the installation pipework. The shut-off device allows an appliance to be isolated / disconnected in the case of an emergency e.g. if the appliance develops a gas leak or otherwise becomes dangerous.

121 **Nothing should be done to a gas appliance which will result in it no longer complying with the standard(s) to which it purports to comply, i.e. as required by the conformity (e.g. CE marking) on the appliance. Any repair to an appliance, for instance involving use of reconditioned or refurbished parts should be done in a way that ensures safety standards are maintained. Engineers should refer to manufacturer's specifications / instructions and appropriate standards.**

122 **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) its operating pressure or heat input, or where necessary both;**
- **d) if it is not reasonably practicable to examine its operating pressure or heat input (or, where necessary, both), its combustion performance;**
- **e) its operation so as to ensure its safe functioning.**

And forthwith take all reasonably practicable steps to notify any defects to the responsible person and where different, the owner of the premises in which the appliance is situated, or where neither is reasonably practicable, the supplier of gas to the premises.

Further information is available in *The Gas Industry Unsafe Situations Procedure*. Where in Great Britain, the defect may be reportable under RIDDOR, gas businesses/engineers are encouraged to report concerns to the Health and Safety Inspectorate (HSI) via e-mail at hsi@gov.je

This requirement shall not apply in respect of:

i) **the direct disconnection of the gas supply of an appliance; or**

ii) **the purging of gas or air from an appliance or its associated pipework or fittings in any case where that purging does not adversely affect the safety of that appliance, pipe or fitting.**

123 Appendix 2 provides details of appropriate tests and examinations that should be carried out. A list of appropriate standards and guidance can be found on the Gas Safe Register website in the *Legislative, normative and informative document list* at www.gassaferegister.co.uk

124 The ACoP requires the operating (i.e. gas) pressure and/or heat input of the appliance to be checked. The engineer should carry out the most appropriate test(s) for the appliance. The information is usually shown in the manufacturers' installation instructions or on the appliance data badge. In certain cases it may be necessary to check both operating pressure and heat input. Where there is no meter or meter display to directly measure the heat input and it is not possible to measure the operating pressure then the appliance's combustion performance should be examined.

125 **The installer of a gas appliance should leave for the use of the owner or the occupier of the premises in which the appliance is installed, all instructions provided by the manufacturer accompanying the appliance.**

Testing of Appliances

126 Where a person installs a gas appliance at a time when gas is being supplied to the premises in which the appliance is installed, they shall immediately thereafter test its connection to the installation pipework to verify it is gastight and examine the appliance and gas fittings and other works for the supply of gas and any flue or means of ventilation to be used with the appliance for the purpose of ascertaining whether:

a) the appliance has been installed in accordance with this ACoP;

b) the operating pressure is as recommended by the manufacturer;

c) the appliance has been installed with due regard to any manufacturers' instructions provided to accompany the appliance; and

d) all gas safety controls are in proper working order.

Testing procedures should be in accordance with appropriate standards and manufacturers' instructions.

127 Where a person carries out such testing and examination, and adjustments are necessary to ensure compliance with the requirements (a) to (d) above, they shall either carry out those adjustments or disconnect the appliance from the gas supply or seal off the appliance from the gas supply with an appropriate fitting. Once commissioning of an appliance is started, it should either be completed in full, leaving the appliance in a safe working condition, or the appliance should be disconnected or sealed off until tests and examination can be fully completed at a later date.

128 Where gas is not being supplied to any premises in which a gas appliance is installed, a person who subsequently allows gas to flow into the appliance should ensure such testing and examination as required in (a) to (d) above is carried out or the supply is sealed off with a fitting to the appropriate standard.

Flues

129 **No gas appliance shall be installed to any flue unless the flue is suitable and in a proper condition for the safe operation of the appliance.**

130 **Whenever an appliance is installed to a flue, the installer should ensure that the flue is adequate, suitable and effective for use with the appliance which it will serve. An effective flue should be complete and continuous throughout its length and safely carry the products of combustion from a gas appliance to the external air.**

131 **This requirement applies however the connection is made (e.g. it covers equally where the appliance is connected to an existing flue, and where a flue is connected to an existing appliance). In each case the necessary tests and examinations should be carried out both before and after the appliance has been fitted. Reference should be made to appropriate standards and manufacturers' instructions.**

132 **The requirements of *Building Bye Laws (Jersey)* should be met concerning flues and chimneys. Fitting a suitable terminal to any flue/chimney is recommended to help products of combustion escape, minimise downdraft and prevent entry of material that may lead to blockage.**

133 It should not be assumed that previous satisfactory operation means that a flue will continue to be safe for use with another appliance, even of the same type. Appropriate tests and examination should always be carried out – see Appendix 2.

134 **A flue pipe should not be installed so that it enters a brick or masonry chimney in such a way that the seal between the flue pipe and the chimney cannot be inspected.**

135 **A gas appliance should not be connected to a flue which is surrounded by an enclosure unless that enclosure is so sealed that any spillage of products of combustion cannot pass from the enclosure to any room or internal space in which the appliance is installed.**

136 **A power operated flue system should not be installed for a gas appliance unless it safely prevents the operation of the appliance if the draught fails.**

137 An interlock should be provided which will cut off the gas supply if the draught falls below a pre-set minimum standard for safe operation of the appliance, and prevent the gas supply being re-established unless safe to do so. The advice of the appliance/flue system manufacturer should be sought, as necessary, in respect of interlock design requirements and reference should be made to appropriate standards, e.g. concerning provision of manual reset facilities and interlocks with flame proving devices.

138 **A flue (including any terminal) should be installed in a position which ensures it will operate effectively and that the products of combustion will safely disperse and not present a hazard to any person, whether in the premises where the appliance is installed (e.g. by being located a safe distance from vents and openable windows), or in adjoining / neighbouring premises. The location needs to take account of possible developments of neighbouring property e.g. building extensions.**

139 **Any flue should be sited to discharge at a safe distance from any boundary with adjoining premises. Refer to the requirements of *Building Bye Laws (Jersey)*, appropriate standards and manufacturers' instructions.**

140 **A flue should not be sited in such a position where it cannot be subsequently examined.**

141 Gas engineers must be able to examine a flue to ensure that it is complete, continuous and correctly installed throughout its length. Where flues are concealed in roof and floor voids or behind false walls etc. engineers will be unable to fulfil their obligation to examine the effectiveness of a flue. Where any flue serving a room sealed appliance is installed in such a void, suitable and sufficient inspection hatches shall be provided which permit the visual inspection of every flue joint contained within the void.

142 Where an automatic flue damper is installed to serve a gas appliance, the engineer must:

a) ensure that the damper is so interlocked with the gas supply to the burner that burner operation is prevented in the event of failure of the damper when not in the open position; and

b) immediately after installation examine the appliance and the damper to verify that they can be used together safely without constituting a danger to any person.

143 A manually operated damper must not be installed to serve a domestic gas appliance. Nor should a domestic gas appliance be installed to a flue which incorporates a manual damper unless the damper is permanently fixed in the open position.

Room-sealed Appliances

144 A gas appliance should not be installed in a room used or intended to be used as a bathroom or shower room unless it is a room-sealed appliance.

145 A gas fire, other gas space heater or gas water heater of more than 14 kilowatt gross heat input should not be installed in a room used or intended to be used as sleeping accommodation unless the appliance is a room-sealed appliance.

146 A gas fire, other gas space heater or gas water heater of 14 kilowatt gross heat input or less should not be installed in a room used or intended to be used as sleeping accommodation, nor should an instantaneous water heater be installed unless:

a) it is a room sealed appliance; or

b) it incorporates a safety control designed to shut down the appliance before there is a dangerous build-up of a dangerous quantity of the products of combustion in the room concerned.

147 The references above to a room used or intended to be used for the purpose therein referred to includes a reference to:

a) a cupboard or compartment within such a room; or

b) a cupboard, compartment or space adjacent to such a room if there is an air vent from the cupboard, compartment or space into the room.

Appendix 1 Diagrams of typical installations

Reproduced from Annex 2 - HSE Publication L56 *Safety in the installation and use of gas systems and appliances* (with permission from the Health and Safety Executive and licenced under the Open Government Licence)

1. These simplified installation diagrams are only intended for use as an aid to identify and indicate the relative positions of components described in this ACoP and guidance.

2. The diagrams are only general illustrations of typical arrangements and variations may occur in specific circumstances. For instance, in certain cases (eg Figures 4 and 6) the 'remote' valve shown as the first emergency control downstream of the distribution main will not be an emergency control in cases where it is intended for use by the gas transporter and/or emergency services rather than gas consumers. In such cases, a valve or valves downstream (eg within individual dwellings) will act as the first emergency control and define the boundary between the service pipe and installation pipework. Reference should also be made to the Institution of Gas Engineers and Managers' (IGEM) document *IGEM/G/1 Defining the end of the network, a meter installation and installation pipework,* which provides detail on a wide range of standard and legacy gas supply installation arrangements.

3. The upstream boundary of the service pipe (i.e. with the distribution main) in Figures 1–7 is not shown.

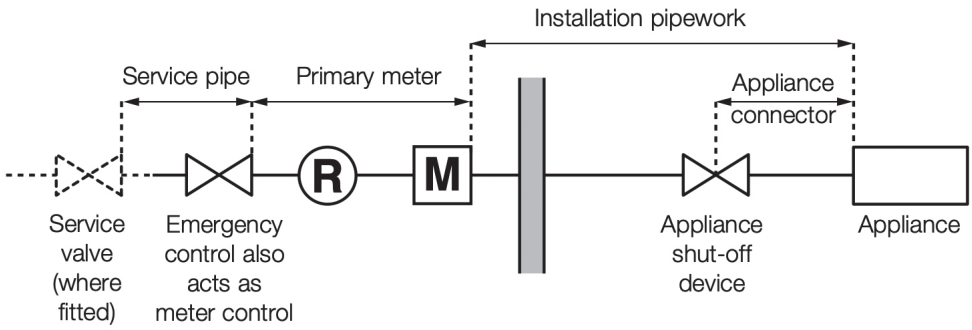

Figure 1 Outside meter installation

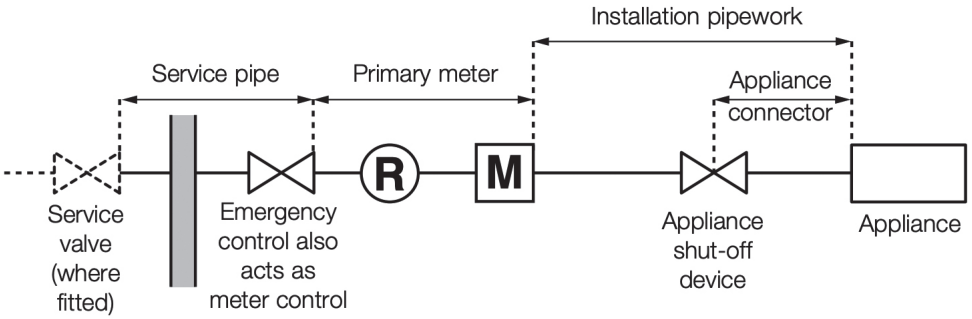

Figure 2 Inside meter installation

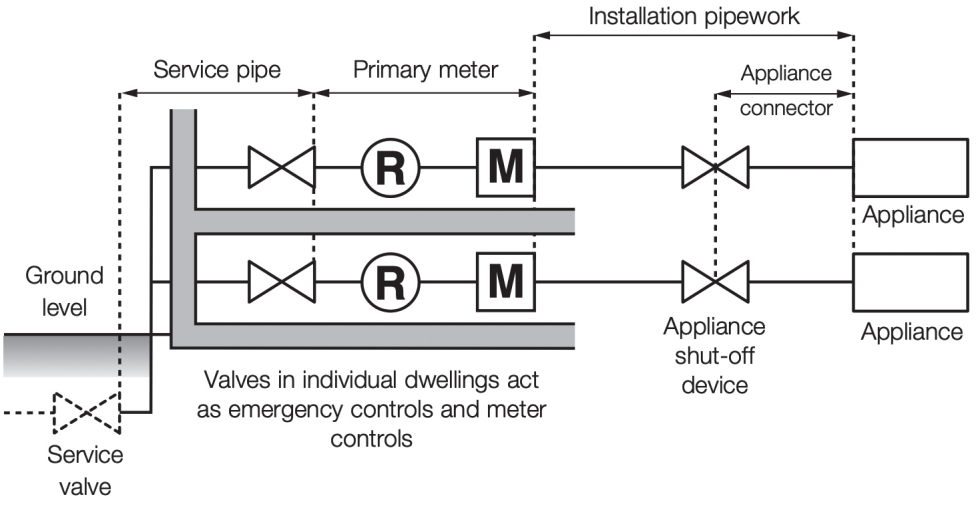

Figure 3(a) Multi-occupancy installation – external riser

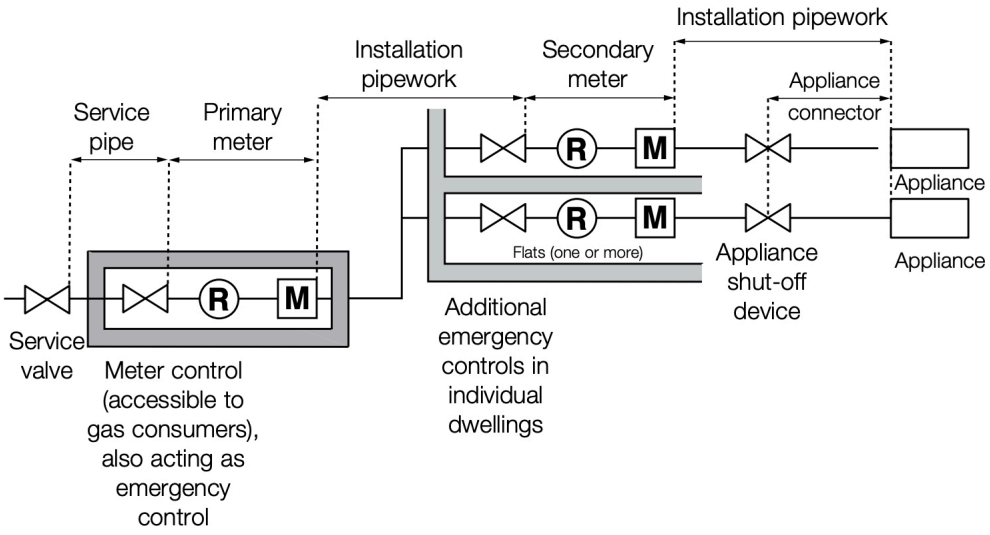

Figure 3 (b) Multi-occupancy installation (remote bulk meter)

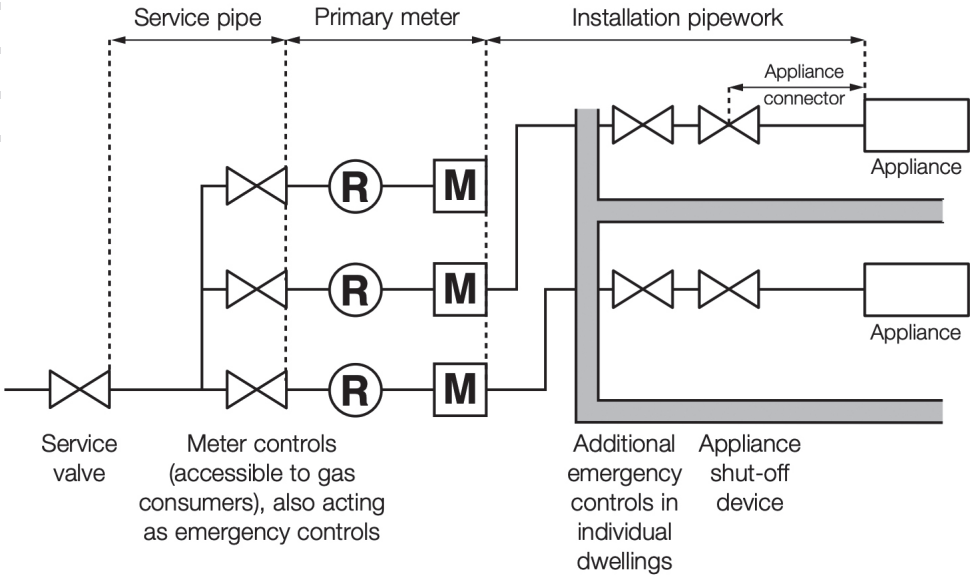

Figure 4 Multi-occupancy installation (remote meters)

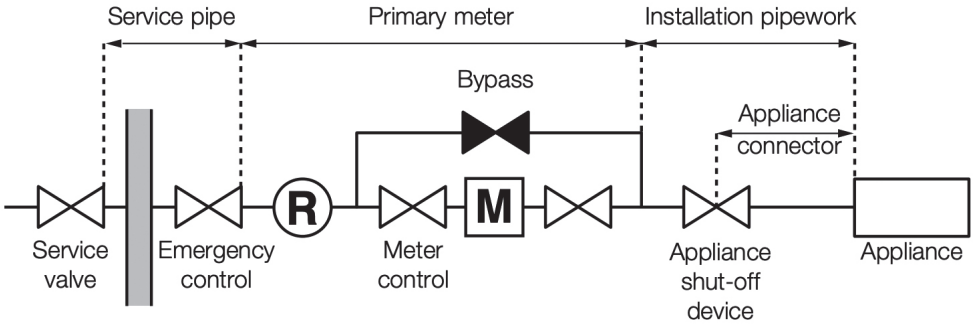

Figure 5 Meter with bypass, e.g. industrial / commercial

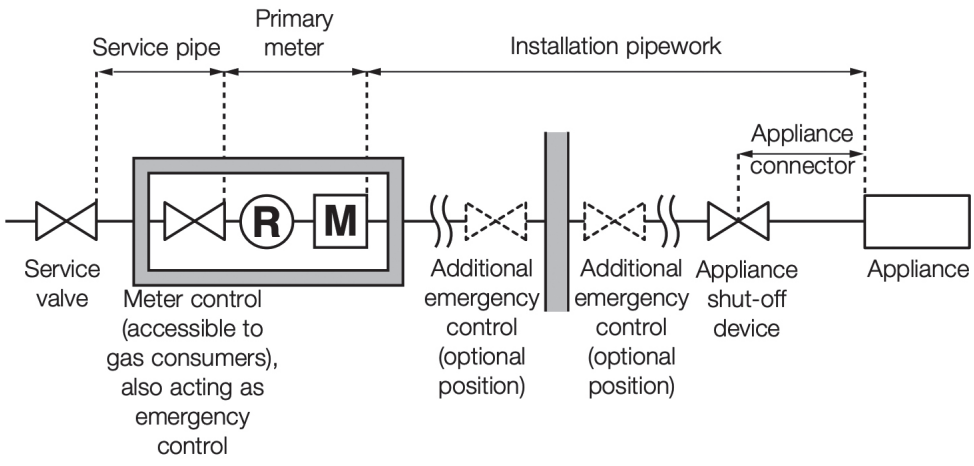

Figure 6 Meter remote from premises, eg meter houses

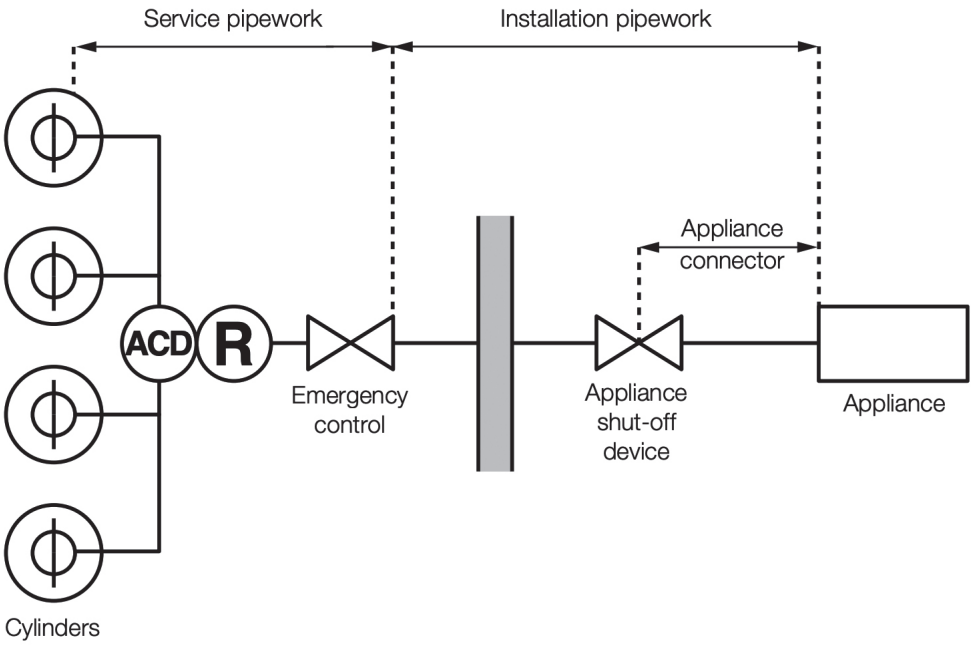

Figure 7(a) LPG systems – cylinder installation

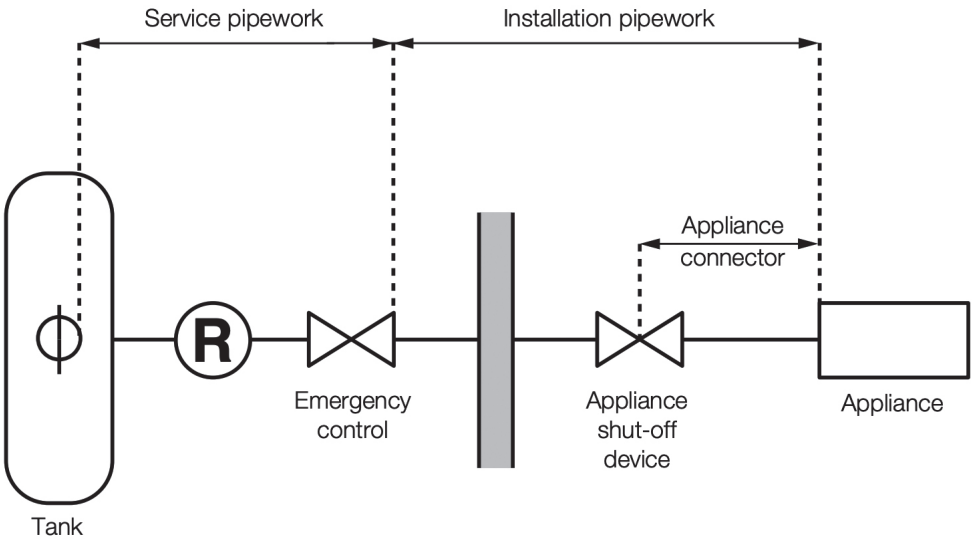

Figure 7(b) LPG systems – single bulk tank installation
(Note: Some vapour installations may have an additional regulator)

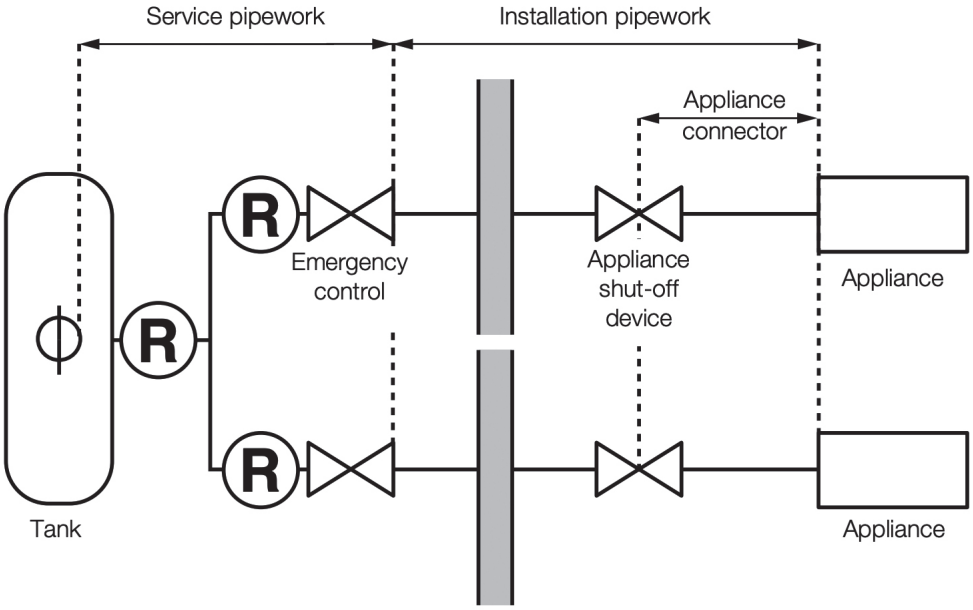

Figure 7(c) LPG systems – single bulk tank installation (multi-residence)

R Regulator

M Meter

Gas emergency control – situated as near as is reasonably practicable to the point where the pipe supplying gas enters the premises or building (see also paragraph 2 of this appendix)

Vapour valve on the storage vessel

ACD Automatic change-over device

Appendix 2 Requirements for appliances and flues

Reproduced from Annex 3 - HSE Publication L56 Safety in the installation and use of gas systems and appliances (with permission from the Health and Safety Executive and licenced under the Open Government Licence)

1. This appendix summarises the main points that need to be addressed, as appropriate, in installation, commissioning, maintenance or safety check work on gas appliances and flues/chimneys serving those appliances. Additional matters may require attention in particular circumstances; reference should be made to the relevant legislation (e.g. Building Bye Laws), manufacturers' instructions and appropriate standards, where applicable, for further information.

Appliances

2. Gas engineers carrying out installation, commissioning, maintenance or safety check work should ensure that:

   (a) the appliance is suitable and, if necessary, adjusted for the type of gas being supplied;

   (b) the appliance type is suitable for the room/location in which it is installed;

   (c) the room or space where the appliance is located is adequately ventilated, and that the means of ventilation is suitable to provide a sufficient permanent supply of air to the appliance for safe combustion of gas. Account needs to be taken of:

      (i) the volume of the room or space;

      (ii) whether draught exclusion or new windows have been fitted, or other changes that could affect ventilation have been made to the room containing the gas appliance(s);

      (iii) the location, type, size and configuration of airbricks and other permanent air vents;

      (iv) whether air inlet ducts of room-sealed appliances are correctly located and remain unobstructed; and

      (v) any other factors which could affect the adequacy of the air supply;

(d) there are adequate and suitable means for removing products of combustion from the appliance (see requirements in 'Flues/chimneys' in paragraphs 3–4);

(e) where it can be measured, the operating pressure and/or heat input of the appliance is correct. Information relating to the appropriate appliance settings is given in manufacturers' installation/servicing instructions or on the appliance data badge;

(f) combustion performance is measured where specified by the manufacturer;

(g) the flame picture (i.e. appearance) is visually checked where possible to ensure that it is satisfactory;

(h) the appliance and associated gas fittings/safety devices (e.g. flame protection and fan proving systems) function safely;

(i) any case seals are forming an effective seal;

(j) the appliance is physically stable, securely fitted and properly connected to other gas fittings;

(k) the appliance is gas tight.

Flues/chimneys

3. Gas engineers testing and checking flues/chimneys (to determine whether they are suitable and in a proper condition for safe operation of the appliance they are intended to serve) should ensure that the requirements in paragraphs 5–20 below are met.

4. How this is carried out will, to some extent, depend on the particular circumstances, and is a matter for judgement by the competent gas engineer carrying out the work. In some cases, the equipment may need to be dismantled, e.g. to establish continuity of a flue/chimney path.

General requirements

5. The flue/chimney should be examined to confirm it is complete, continuous and correctly installed throughout its length. It should be undamaged and adequately supported, paying particular attention to any joints and sections of the flue/chimney passing through any roof space or void.

6. For an existing flue/chimney, where access cannot be gained for examination (e.g. where it passes through adjacent property), other means of managing the risk of flue system failure should be adopted. Relevant industry guidance should be followed and appropriate action taken.

7. Where there are good reasons to suspect flueing problems (e.g. because of flue flow/spillage test failure, ceiling staining or any evidence of products of combustion entering the property etc.) the complete length of the flue/chimney should be examined. Any associated appliance must not be used unless or until this is done and it has been confirmed as safe to use.

Room-sealed flues

8. The terminal should be correctly sited. This should include adequate separation from any site boundary, openable windows and doors, air vents, other terminals etc. to ensure that the flue/chimney will continue to function safely and emissions will not present a hazard to any person either on the site concerned or in an adjoining property, including in the event of any future building development on adjoining premises (which might extend close or up to the property boundary).

9. Where access cannot be gained for examination, such as where a flue/chimney runs partly through property not owned by the responsible person/dutyholder (e.g. landlord) and access is refused by the occupant, all reasonable steps should be taken to ensure overall flue/chimney integrity. This could reasonably involve making enquiries in writing or in person with occupants of other properties and requesting to see evidence of examinations.

Open/closed flues

10. A flue/chimney should not have openings, other than:

    (a) a draught diverter, balancing damper or relief opening which is in the same room, or space, as the appliance being served;

    (b) an opening for inspection or cleaning, which is fitted with a non-combustible gas-tight cover; or

    (c) an opening integral and essential to the correct operation of the flue/chimney, which is purpose-designed and properly located for its application, e.g. an opening in a vertex flue in an unoccupied roof space (a guard should be fitted around such an opening, where necessary, to prevent restriction or possible ignition of nearby materials).

11. No more than one appliance should be connected to a flue/chimney, unless it has been specifically designed for this purpose.

12. The effect of other flued appliances or fans etc. in the same room should be properly taken into account. Where more than one such appliance or fan is installed it should be ensured that they are working safely with all permutations of appliances that may be in operation at any one time, including those burning fuel other than gas.

13. The terminal should be correctly sited; this should include adequate separation from other nearby structures, e.g. openable windows, chimney stacks etc.

14. Any flue/chimney should not be (or have been) closed over/modified so as to interfere with flue/chimney operation. Any flue damper or restrictor plates should be removed or permanently fixed open to avoid obstructing the flue/chimney.

15. Any debris, e.g. in a fire/catchment space, should be removed before installing/reinstalling an appliance. The catchment space should be of adequate size and any openings within this space (other than those for the appliance connection and flue/chimney) should be effectively sealed. Flues/chimneys previously used for oil or solid fuel appliances need to be effectively swept and examined before being used with a gas appliance.

16. Where a masonry chimney seems to be in a poor condition or poorly constructed, it should be thoroughly examined to determine whether it is safe for continued use. Remedial work should be carried out where necessary and consideration given to fitting a (correctly sized) flue/chimney liner; in certain cases, a liner is required under Building Bye Laws.

17. Where components such as external sections of flues/chimneys (e.g. terminals), liners and inspection openings show signs of damage (e.g. corrosion), they should be replaced as necessary. When replacing an appliance connected to a chimney lined with a liner, the existing liner should normally be replaced unless it is considered suitable for safe operation throughout the lifespan of the new appliance.

18. When flue/chimney liners are fitted or replaced, the flue/chimney should be tested to ensure it is operating satisfactorily.

19. A flue flow test should be carried out to check the effectiveness of the flue/chimney and ensure that there is no leakage into another part of the premises (including any roof space or void) or, as appropriate, other adjoining premises. (This is particularly important where a number of chimneys combine into a multiple chimney stack.) Smoke coming out of a terminal which is not the correct terminal, or a down-draught or no-flow condition, indicates an unsatisfactory flue/chimney.

20. After completion of a satisfactory flue flow test, a spillage test should be carried out, with the appliance connected and operating, to check that the products of combustion are being safely removed. The tests should be conducted in accordance with the appliance manufacturer's instructions, and take into account any factors which may adversely affect flue/chimney performance, e.g. operation of fans, tumble driers or forced-air heating systems in the room housing the appliance or any adjoining room (with interconnecting doors open).

Note: Commercial (and industrial) premises often have purpose-designed flue/chimney systems. The flue/chimney system's manufacturer's instructions and/or appropriate standards need to be followed when maintaining and examining such systems.

Appendix 3 Composition of 'mains' gas in Jersey – information for gas engineers

It is important that gas installers have an understanding of the principles of combustion and the reason why complete combustion – the correct mixture of the fuel gas and oxygen – is necessary to ensure gas safety. The guidance and procedures in this part are relevant to LPG/Air (commonly known as Mains Gas) and to Propane (C_3H_8) and Butane (C_4H_{10}), which are types of Liquefied Petroleum Gas (LPG).

Combustion

In order to understand the process that takes place during combustion and to understand what is being produced, some simple chemistry is necessary.

Combustion is a chemical reaction requiring 3 essential elements: FUEL + OXYGEN + IGNITION. The reaction between these elements will create heat. The products created by that reaction are referred to as the products of combustion (POC). As Mains Gas, Propane and Butane are carbon-based gases, carbon monoxide (CO) can be produced when they are burned if the combustion process is incorrect. Mixtures of these gases with oxygen (O_2) are also highly explosive if not controlled during combustion.

Complete Combustion

The ideal mixture of a fuel gas and air is called the "stoichiometic mixture".

To ensure complete combustion, one volume of Propane must react with 5 volumes of oxygen and 2 volumes of Butane must react with 13 volumes of oxygen. The resulting products of combustion would mainly consist of carbon dioxide (CO_2) and water vapour (H_2O). The basic chemical reaction for complete combustion of Propane and Butane can be shown in the following equations:

1. Propane

   $C_3H_8 + 5O_2 + \text{IGNITION} = \text{HEAT} + 3CO_2 + 4H_2O$

   Propane + Oxygen + Ignition =

   Heat + Carbon Dioxide + Water Vapour

2. Butane

$2C_4H_{10} + 13O_2 + IGNITION = HEAT + 8CO_2 + 10H_2O$

Butane + Oxygen + Ignition =

Heat + Carbon Dioxide + Water Vapour

The air (atmosphere) we breathe consists basically of 20% oxygen and 80% nitrogen. Nitrogen (N_2) is an inert gas and takes no part in the combustion process.

Incomplete Combustion

An incorrect fuel/oxygen mix may cause incomplete combustion.

When incomplete combustion occurs, CO is produced as part of the products of combustion. It is essential that the production of CO, which is a highly toxic gas, is prevented by ensuring that appliance(s) achieve complete combustion.

This reaction, and the production of CO, can be seen in the following chemical equation using Butane:

$1m^3\ C_4H_{10} + 1.75m^3\ O2 + 8m^3\ N_2 = 0.5m^3\ CO + 0.5m^3\ CO_2 + 2m^3\ H_2O + 8m^3\ N_2$

Butane + Insufficient Oxygen + Nitrogen =

Carbon Monoxide + Carbon Dioxide + Water Vapour + Nitrogen

Gas Characteristics

For combustion to be usable, it must be controlled. If uncontrolled, it will be dangerous and inefficient.

To control combustion, achieve fuel efficiency and complete the combustion process, it is necessary to understand the characteristics of the fuel and the way it burns. The following section provides guidance.

Specific Gravity (SG)

This is the weight or mass of the gas in relation to that of air. Air has an SG of 1.00.

Mains Gas used in Jersey has an SG of approximately 1.2 and so is therefore slightly heavier than air. Propane has an SG of 1.5 and is therefore one and a half times heavier than air. Butane has an SG of 2.0 and is therefore twice the weight of air.

Appendix 3

Calorific Value (CV)

When gases burn, they give off heat. This is measured in megajoules per cubic metre (MJ/m^3) or British Thermal Units per cubic foot (Btu/ft^3) and is known as the calorific value (CV). In Jersey Mains Gas has a nominal CV of 24.96 MJ/m^3 (670 Btu/ft^3). Propane has an average CV of 93.1 MJ/m^3. Butane has an average CV of 121.8 MJ/m^3.

Gross and Net CV's

Historically, the heat input of a gas appliance in the UK was given in terms of gross calorific value (CV).

The changeover from gross CV to net CV was undertaken as part of the 'Europeanisation' of appliance safety standards. It is important therefore to determine whether the manufacturer provides details of the heat input on the appliance data plate, or appliance installation instruction on the basis of gross CV or net CV.

The CV of a fuel is, in simple terms, the amount of heat contained in a given quantity of that fuel. When fuels that contain hydrogen in their chemical make-up are burned, that hydrogen is converted to water vapour. The water vapour holds some of the heat produced as 'latent heat' (in the case of Propane, this is about 8% of the total heat). This latent heat is included in the figure for the gross CV of a fuel, but is excluded from the figure given for the net CV.

Table 1 Gas Characteristics

Characteristics at standard temperature and pressure	Commercial Propane	Commercial Butane	Observations	Nat Gas	Jersey Mains Gas
Specific Gravity (SG) (relative density) (SG of air = 1)	1.5	2.0	Methane will rise, whereas Propane and Butane will gather at a lower level. Methane will diffuse into the air quicker than Propane or Butane	0.6	1.14-1.21
Gross Calorific Value (CV)	93.1 MJ/m^2	121.8 MJ/m^3	Appliances must only be used on the gas type for which they were designed.	37.5-43.0 MJ/m^3	24.96 MJ/m^3
Wobbe number (MJ/m^3)	73.5 to 87.5	73.5 to 87.5	Approximate Wobbe number range	47.2-51.4 MJ/m^3	23.1 to 23.9
Supply pressure (operating/working pressure)	37mbar	28mbar	Natural Gas appliances may have burner adjustments - Generally, LPG appliances do not.	21.25 mbar	14mbar ± 2mbar
Installation Pipework Working pressure loss	2.5 mbar	2.5 mbar	Working pressure loss with appliances in operation is directly proportional to the specific gravity of the gas being supplied through the pipework	1 mbar	2 mbar
Stoichiometric air requirements by volume/volume gas (m^3)	23.76:1	30.00:1	LPG requires a greater amount of air to burn per volume than Natural Gas	9.6:1	6.37:1
Flame Speed	0.46 m/s	0.45 m/s	The speed at which a flame will burn along a gas/air mixture	0.36 m/s	0.45 m/s
Flammability Limits	2 to 10% gas in air	2 to 9% gas in air	Gas and air mixtures will only burn within these ranges	5 to 15% gas in air	2 to 10% gas in air
Maximum Flame Temperature	1980°C	1996°C	Approximate temperatures	1953°C	As per Commercial Propane
Ignition Temperature	470°C	408°C	Approximate temperatures	564°C	As per Commercial Propane

Note: These figures are approximate due to slight variations in gases.

Wobbe Number (Index)

This is a number (Index) used to give an indication of the heat produced at a burner when fuelled by a particular gas. The amount of heat produced by a burner depends on the following factors:

- Gross CV of the gas
- SG of the gas
- Size of the injector orifice
- Gas supply pressure to the injector.

The Wobbe number is calculated by dividing the gross CV by the square root of the SG:

Wobbe Number = $\frac{CV}{\sqrt{SG}}$

Supply Pressure (operating/working pressure)

Mains Gas, when supplied though a regulator, normally maintains an outlet working pressure of 14mbar when measured at the outlet of the meter. This is often reduced further at the appliance to provide the required pressure at the Burner.

Note: There are some properties in Jersey that operate at an outlet supply pressure of 20mbar. Where this is the case, this will be clearly stated on a label on the gas meter serving the property.

LPG is supplied via vessels or cylinders and operates at a pressure of 37mbar for Propane and 28mbar for Butane. This can be metered if required before passing into the appliance(s). This pressure is not normally reduced at the appliance.

Gas Rate

This means the amount (volume) of gas an appliance burns. This will depend mainly on the supply pressure and orifice size of the burner injectors(s). Appliance 'data plates' may express the gas heat input as a gross or net figure. When an accurate rating is required, a test can be undertaken at the gas meter.

Heat Input

This is the heat input of any given appliance expressed in kW/hr. Wherever an appliance heat input is being measured at the meter, gas installers must utilise the correct CV in any measurement otherwise an inaccurate conclusion will result.

Flame Speed

Different types of fuel gases burn at different rates. The flame speed of Propane is 0.46m/second and Butane is 0.45m/second. The flame speed of Mains Gas is similar to that of Propane or Butane.

To keep a flame stable on a burner, the pressure at which the gas is supplied and the size of the injector orifice needs to be carefully calculated to ensure that the rate at which the gas is supplied matches the rates at which it is burned.

If gas were supplied faster than it could burn, the flame would lift off the burner. If gas were supplied too slowly, it would ignite/light back into the burner mixing tube.

To keep the main flame stable, many burners have retention devices. These are usually smaller flames burning with air/gas mixtures at lower speeds than the main flames. These retention flames continuously relight the main flames as they try to lift off the burner.

Flammability Limits

Fuel gases will only burn in air between certain limits. For Mains Gas and Propane, the range is between 2% and 10% gas in air. For Butane, the range is between 2% and 9% gas in air.

Ignition Temperature

Any form of ignition needs to be hot enough to ignite the gas being used. Propane ignites at approximately 530˚C and Butane ignites at approximate 408˚C. The ignition temperature of Mains Gas would depend on whether Propane or Butane was being used and the appropriate ignition temperature will apply.

Appendix 4 Carbon monoxide (CO) alarms

CO alarms are not covered in this ACoP. Although CO alarms are a useful back-up precaution and their use is recommended for safety they should not be regarded as a substitute for proper installation and maintenance of gas equipment by a Gas Safe registered engineer.

Such alarms should comply with BS EN 50291 and carry the appropriate conformity marking. CO alarms should be installed, checked, maintained and serviced in accordance with the manufacturers' instructions.

The Public Health and Safety (Rented Dwellings – Minimum Standards and Prescribed Hazards) (Jersey) Order 2018 requires a CO alarm to be installed in each habitable room of a rented dwelling where there is the facility for the combustion of gas.

The *Building Bye Laws (Jersey) 2007* require the provision of a CO alarm where a new or replacement fixed appliance designed to burn oil or gas is installed in dwelling for the purposes of providing space or hot water heating in the room where the appliance is located *(Technical Guidance Document, Part 3 Combustion Appliances and Fuel Storage systems)*

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