



Gas industry unsafe situations procedure

IGEM/G/11 Edition 2 with amendments July 2022 and June 2024
Communication 1887



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Founded 1863
Royal Charter 1929
Patron: His Majesty the King



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CONTENTS

SECTION	PAGE	
1	Introduction	1
2	Scope	3
3	Legal and allied considerations	4
	<ul style="list-style-type: none"> ● 3.1 General ● 3.2 Health and Safety at Work etc. Act (HSWA) ● 3.3 Gas Safety (Installation and Use) Regulations (GS(I&U)R) ● 3.4 Gas Safety (Management) Regulations (GS(M)R) ● 3.5 The Gas Safety (Rights of Entry) Regulations ● 3.6 Non-Domestic Premises within HSWA (Outside Scope of GS(I&U)R) ● 3.7 Reporting of Injuries, Diseases, and Dangerous Occurrences Regulations (RIDDOR) 	4 4 4 5 5 6 6
4	Applying GIUSP within the limits of engineers' competencies	7
5	Overview of process	8
6	Dealing with unsafe situations	10
	<ul style="list-style-type: none"> ● 6.1 Immediately Dangerous (ID) Appliances/Installations ● 6.2 At Risk (AR) Appliances/Installations 	10 12
7	Gas incidents	15
	<ul style="list-style-type: none"> ● 7.1 First person on site ● 7.2 Attending a site where it is suspected that a gas incident may have occurred 	15 15
8	RIDDOR, unsafe gas work and theft of gas reporting	16
	<ul style="list-style-type: none"> ● 8.1 General principles ● 8.2 What to report under RIDDOR 11(1) Gas incident ● 8.3 What to report under RIDDOR 11(2) Dangerous gas fittings ● 8.4 ID Situations not reportable under RIDDOR 11(2) ● 8.5 When and how to report under RIDDOR ● 8.6 How to report unsafe situations due to poor workmanship which are not reportable under RIDDOR ● 8.7 Theft of Gas / Meter Tampering/Interference of an LPG vessel 	16 16 16 17 17 17 17
9	Giving guidance on particular situations and how to categorise them	18
	<ul style="list-style-type: none"> ● 9.1 Introduction 	18
APPENDIX		
1	Glossary, acronyms, abbreviations, symbols and units	47
2	References	53
3	Applying GIUSP	55
4	Gas emergencies	56

5	Visual risk assessment of gas appliances	58
6	Minimum warning notice requirements	60
7	RIDDOR/Gas Safe Register reporting flow chart	61

TABLE

1	Giving guidance on particular situations and how to categorise them	18
2	Contact details of Gas Emergency Service Providers (ESPs) and Gas Suppliers (GSs) in the British Isles	57
3	Minimum visual checks to ensure compliance	58

FIGURE

1	GIUSP Appliance/Installation risk classification process	9
2	Example of "DANGER DO NOT USE" label	11
3	Reporting unsafe workflow diagram	61

SECTION 1: INTRODUCTION

- 1.1 This Procedure supersedes 2nd Edition of IGEM/G/11 with amendments July 2022 The Gas Industry Unsafe Situations Procedure (GIUSP), which is obsolete.
- 1.2 This Procedure has been drafted by a Panel appointed by the Institution of Gas Engineers and Managers' (IGEM's) Technical Coordinating Committee, subsequently approved by that Committee; the Gas Utilisation Committee, the Gas Measurement Committee and the Gas Transmission and Distribution Committee and published by the authority of the Council of IGEM.
- 1.3 >> This Procedure is for use by Gas Safe registered businesses/engineers when dealing with unsafe situations in domestic and non-domestic premises supplied with Natural Gas, Liquefied Petroleum Gas (LPG) and Hydrogen as defined in the Gas Safety (Installation and Use) Regulations 1998.<<
- 1.4 In creating this version of GIUSP the Panel has used the Gas Safety (Installation and Use) Regulations GS(I&U)R 1998 and their Approved Codes of Practice (ACoP) guidance document L56 when applying the ID and AR categories as defined in Section 6.
- 1.5 This Procedure makes use of the terms "must", "shall" and "should" when prescribing particular requirements. Notwithstanding clause 1.8:
- the term "must" identifies a requirement by law in Great Britain (GB) at the time of publication
 - the term "shall" prescribes a requirement which, it is intended will be complied with in full and without deviation
 - the term "should" prescribes a requirement which, it is intended will be complied with unless, after prior consideration, deviation is considered to be acceptable.
- Such terms may have different meanings when used in Legislation, or Health and Safety Executive (HSE) ACoPs or guidance, and reference needs to be made to such statutory Legislation or official guidance for information on legal obligations.
- 1.6 The primary responsibility for compliance with legal duties rests with the employer. The fact that certain employees, for example "competent engineers", are allowed to exercise their professional judgement does not allow employers to abrogate their primary responsibilities. Employers must:
- have done everything to ensure, as far as is reasonably practicable, that there are no better protective measures that can be taken other than relying on the exercise of professional judgement
 - have systems and procedures in place to ensure that the exercise of professional judgement by "competent engineers" is subject to appropriate monitoring and review
 - not require "competent engineers" to undertake tasks which would necessitate the exercise of professional judgement that is beyond their competence. There should be written procedures defining the extent to which "competent engineers" can exercise their judgement. When "competent engineers" are asked to undertake tasks which deviate from this, they should refer the matter for higher review.

1.7 It is now widely accepted that the majority of accidents in industry generally are in some measure attributable to human as well as technical factors. People who initiated actions that caused or contributed to accidents might have acted in a more appropriate manner to prevent them.

To assist in the control of risk and proper management of these human factors, due regard is to be taken of HSG48 and HSG65.

1.8 Notwithstanding clause 1.5, this Procedure does not attempt to make the use of any method or specification obligatory against the judgement of the competent engineer. Where new and better techniques are developed and proved, they should be adopted without waiting for modification of this Procedure. Amendments to this Procedure will be issued when necessary and their publication will be announced in the Journal of IGEN and other publications as appropriate.

1.9 This Procedure has been drawn up by the gas industry, **in order to assist competent engineers** in meeting their legal duties in accordance with the GS(I&U)R and associated Approved Code of Practice and Guidance and correctly classify unsafe gas installations.

Note: The general principles of the Gas Industry Unsafe Situations Procedure (GIUSP) may be:

- used as a guide to action in premises which fall outside the scope of GS(I&U)R
- used in geographical areas not covered by the GB edition of GS(I&U)R e.g., Guernsey, Jersey, Isle of Man and Northern Ireland.

HSE supports this Procedure, which will assist the industry in maintaining a consistent approach to the risk assessment of gas installations.

This Procedure is in effect a "live" document and is revised periodically as new information/guidance is developed. To ensure that you keep up-to-date with the current requirements of this Procedure, visit: <http://igem.org.uk/> or <https://www.gassaferegister.co.uk/sign-in/> and login and visit the Technical Information area and search for the controlled (current) copy.

1.10 Requests for interpretation of this Procedure in relation to matters within its scope, but not precisely covered by the current text, should be either:

- addressed to Technical Services, IGEN, IGEN House, 26-28 High Street, Kegworth, Derbyshire, DE74 2DA; or
- emailed to technical@igem.org.uk.

These will be submitted to the relevant Committee or Panel for consideration and advice, but in the context that the final responsibility is that of the engineer concerned. If any advice is given by or on behalf of IGEN, this does not relieve the competent engineer of any of his or her obligations.

1.11 This Procedure was published in June 2024.

1.12 Amendments from July 2022 are shown throughout the document by ►◀

1.13 Amendments from June 2024 are shown throughout the document by ►►◀◀

SECTION 2: SCOPE

- 2.1 The information provided in this Procedure is relevant to all commissioned gas equipment (installations and appliances) installed in both domestic and non-domestic premises (see also Section 3.6). Based on assessed risk, it aims to provide guidance to competent engineers when dealing with various situations which currently, or may in the future, affect safety.
- 2.2 The priority for gas engineers when encountering an unsafe situation is to safeguard life and property. It is essential that gas engineers are able to identify gas equipment which presents a danger or potential danger and take prompt corrective actions to eliminate such danger.
- 2.3 ►Italicised text is informative and does not represent formal requirements.◀
- 2.4 ►Appendices are informative and do not represent formal requirements unless specifically referenced in the main sections via the prescriptive terms “must”, “should” or “shall”.◀

SECTION 3: LEGAL AND ALLIED CONSIDERATIONS

3.1 GENERAL

➤➤Those working on gas installations are duty bound to comply with the law, in particular The Health and Safety at Work Act etc 1974 and the Gas Safety (Installation and Use) Regulations 1998. IGEM G/11 is a guidance document which provides an agreed industry approach on how those working on gas installations may comply with the requirements of the law. ◀◀

3.2 HEALTH AND SAFETY AT WORK ETC. ACT (HSWA)

There is a duty under this Act for everyone at work (employers and the self-employed) to ensure, as far as reasonably practicable, that their activities or omissions do not expose others to risk.

3.3 GAS SAFETY (INSTALLATION AND USE) REGULATIONS (GS(I&U)R)

3.3.1 GS(I&U)R are concerned with the installation and use of gas fittings in all domestic premises and commercial premises e.g., hospitals, educational establishments, offices, hotels, restaurants, mobile catering units, leisure accommodation vehicles, (including caravan holiday homes and hired touring caravans), inland waterway craft hired out to the public and sleeping accommodation, wherever it is located.

➤Generally, GS(I&U)R do not apply in factories, mines, quarries, sewage works, and agricultural premises. They do however apply to parts of these premises used for domestic or residential purposes, or as sleeping accommodation.◀ Other safety legislation does apply (e.g. HSWA) and general principles of GIUSP may be applied in these premises (see clause 3.6).

The legal definition of “factory” is wide ranging and in addition to manufacturing and/or processing premises, includes printing, fruit and vegetable packing, scrap yards, repair workshops (e.g., for televisions or vehicles), dairies, prison workshops, certain warehouses using mechanical power, and power stations etc.

GS(I&U)R place particular requirements on gas engineers relating to matters of gas safety. Under the requirements of these Regulations, engineers have to make judgements on the level of risk. In particular, this relates to Regulations 26(9), 34(3) and 34(4). The ACOP and L56 guidance document, Safety in the installation and use of gas systems and appliances, is available from the HSE web site via the following web link:

<http://www.hse.gov.uk/pubns/priced/l56.pdf>

GS(I&U)R require any person carrying out any gas work, who becomes aware of an unsafe or dangerous situation, to inform the responsible person.

However, this duty only extends to those issues which are within the competence of the person engaged in work and which it is reasonable to expect the person to notice through visual inspection, for example, when relighting an appliance following the interruption of the gas supply or when observing an appliance in the course of other work. It is not expected that additional tests and examinations be undertaken on appliances not being worked on by that person.

A gas engineer would be expected to be able to identify apparent unsafe situations from a visual inspection. For further guidance refer to Appendix 5.

GS(I&U)R also make it an offence for a gas user/responsible person or any other person, to use a gas appliance/installation once they have been advised that the appliance/installation constitutes a danger.

3.3.2 **Equipotential Bonding Electrical Safety Issue**

Regulation 18(2) of GS(I&U)R places a duty on gas engineers to notify the responsible person that equipotential bonding may need to be connected to gas installations in domestic premises.

➤➤ *Note: Where non-metallic (non-conductive e.g., PE) service pipes/service pipelines enter the building and are then connected to metallic pipes within the building, the metallic pipes within the building may not require protective bonding. ◀◀*

Where required, the purpose of equipotential bonding is to ensure the gas installation, other metallic services, and parts within the premise remain safe under electrical fault conditions.

Where bonding is necessary it should preferably be connected:

- within 600 mm of the outlet of the gas meter, before any branch, or
- where the meter is fitted outside the building, as near to the point of each entry of the pipework, inside the building, before any branch.

Where a gas engineer cannot confirm that adequate bonding arrangements, where necessary, exist, HSE guidance is that the responsible person be notified in writing of the requirement for equipotential bonding. This can be achieved by leaving a bonding notice as described in BS 6891 which advises that the bonding be checked/carried out by an electrically competent person.

For further information, refer to Technical Bulletin TB 102.

<https://www.gassaferegister.co.uk/sign-in/> - login and visit the Technical Information area.

3.4 **GAS SAFETY (MANAGEMENT) REGULATIONS (GS(M)R)**

GS(M)R place duties on Gas Transporters (GT) to provide a 24/7 gas emergency service on their Networks by employing Emergency Service Providers (ESPs) and operating the National Gas Emergency 0800 111 999 free phone number.

Anyone contacting the National Gas Emergency number will be given safety advice, including how to turn off the supply and ventilate the property.

ESPs must respond to and make safe all reported gas emergencies, including gas escapes and carbon monoxide (CO)/fumes, as soon as reasonably practicable. This will result in any unsafe appliance or installation being made safe pending further investigation by another competent engineer.

Suppliers of LPG have similar duties to those described above. These are covered by GS(I&U)R.

3.5 **THE GAS SAFETY (RIGHTS OF ENTRY) REGULATIONS**

These regulations apply to GTs, who have rights to enter premises in respect of suspected escapes of gas or dangerous appliances without the consent of the owner or occupier.

These rights can only be exercised where the GT has reasonable cause to believe that there is a danger to life or property and immediate entry to the premises is necessary to make safe.

On entering premises the GT may disconnect and seal off appliances/fittings or the entire gas installation if considered necessary "for the purpose of averting danger to life or property".

3.6 **NON-DOMESTIC PREMISES WITHIN HSWA (OUTSIDE SCOPE OF GS(I&U)R)**

For non-domestic premises that are outside the scope of GS(I&U)R, the safety principles outlined in this Procedure can be used to classify the level of risk and determine the safe course of action to take.

Engineers shall consult with the responsible person on site although this may be waived in extreme circumstances i.e., where a delay to consult with the responsible person would immediately endanger life or property. The responsible person shall exercise their professional judgement, through risk assessment, to determine the safe course of action to be taken.

Where deviation from the actions advised in this Procedure is being considered by the responsible person, they should complete a documented risk assessment to determine a safe course of action following the identification of an unsafe situation. The responsible person should draw upon expert knowledge of any specific process, safety controls, industry standards, manufacturer's guidance or company procedures that are available, taking into account the process and business risk from the actions proposed. In all cases, it is essential that the engineer keeps accurate documented records of tests and/or checks completed.

The risk assessment may conclude that a gas appliance/installation may remain in use provided that additional safety measures have been put in place.

Note: There are some industrial processes that would present an immediate health and safety risk if shut down in an uncontrolled manner. For example, some furnaces require gradual shut-down and cooling over a number of days to ensure the furnace does not collapse and some glass producing processes utilise tanks of molten tin to float the cooling glass. An immediate shut-down of an industrial process or large gas installation could produce its own risks from gas pressure loss in the system that may require complex testing and purging procedures to re-instate.

3.7 **REPORTING OF INJURIES, DISEASES AND DANGEROUS OCCURRENCES REGULATIONS (RIDDOR)**

Under RIDDOR registered businesses or their engineers are required to notify the HSE of certain unsafe situations (see also Section 8).

SECTION 4: APPLYING GIUSP WITHIN THE LIMITS OF ENGINEERS' COMPETENCIES

- 4.1 All engineers working on, or encountering, appliances/installations that are unsafe shall classify the unsafe situation as ID or AR as appropriate ("work" is defined by GS(I&U)R (see Appendix 1)).

Where "work" is not carried out, a visual risk assessment shall be undertaken on those appliances/installations that are encountered for evident safety-related defects and this Procedure applied, where appropriate, within the limits of the engineer's competence. If a competent engineer is unsure of the safety of an appliance/installation, further guidance should be sought immediately. For further guidance on visual risk assessment of appliances or installations, reference should be made to Appendix 5 of this Procedure.

Competence in safe gas installation work requires engineers to have enough knowledge, practical skill, and experience to carry out the job in hand safely, with due regard to good working practice. Competence must be kept up to date, e.g. through awareness of changes in law, technology and safe working practice.

In applying the classifications used in this procedure, the competent engineer shall be able to justify their rationale based on the situation on site - the examples in this procedure are not exhaustive and/or definitive and the final decision in applying classifications lies with the competent engineer on site following their site-specific risk assessment.

SECTION 5: OVERVIEW OF PROCESS

- 5.1 When assessing whether any gas appliance/installation is installed correctly, the engineer shall in the first instance consult the manufacturer's instructions where available (which may deviate from appropriate standards) for the appliance/installation. Where the manufacturer's instructions for the appliance/installation are not available, an assessment against the requirements of the current versions of the appropriate standards shall be carried out (see also Section 4 and Section 9 of this Procedure).

When engineers carry out new installation work, they shall ensure that the appliance/installation is installed and fully commissioned in accordance with GS(I&U)R, manufacturer's instructions and other appropriate industry standards. The Gas Safe Register Legislative, Normative and Informative Document List (LNIDL) provides a current list of Normative Documents - this can be viewed on line by visiting:

<https://www.gassaferegister.co.uk/normativedocumentlist> - login and visit the Technical Information area.

- 5.2 If the appliance/installation cannot be fully commissioned, the appliance/installation must not be left connected to the gas supply. The gas supply to the appliance/installation concerned must be disconnected and sealed with an appropriate fitting. It should be labelled to the effect that it must not be used until full and proper commissioning tests have been carried out.

►►When determining the appropriate risk classification, the G/11 Panel used the process shown in Figure 1. This same process forms the basic approach to any unlisted situation.◀◀

Table 1 (Section 9) gives guidance to competent engineers regarding the categorisation of unsafe situations.

Table 1 is not exhaustive and individual circumstances may require different actions to be taken.

Therefore, engineers should exercise engineering judgement to their actions within their area of competence and, where there is doubt, seek further guidance.

In applying the classifications used in this Procedure, the competent engineer shall be able to justify their rationale based on the situation on site - the examples in this procedure are not exhaustive and/or definitive and the final decision in applying classifications lies with the competent engineer on site following their site-specific risk assessment.

Note: It is advisable to keep records for at least 6 years in the event of any possible future civil litigation.

Gas appliances/installations found to be unsafe shall be classified as either:

- Immediately Dangerous (ID), or
- At Risk (AR).

5.3 When an engineer identifies an unsafe situation, the principal objective shall be to make safe and advise the responsible person not to use the appliance/installation.

In a limited number of cases, turning off the appliance/installation will not remove the risk (see Figure 1 and clause 6.2.2). Table 1 includes examples of these situations e.g., built over Polyethylene (PE) gas service pipes and LPG bulk storage vessels incorrectly located.

In carrying out these actions, the gas user/responsible person shall be informed of the reasons and advised that they are carried out in the interest of gas safety.

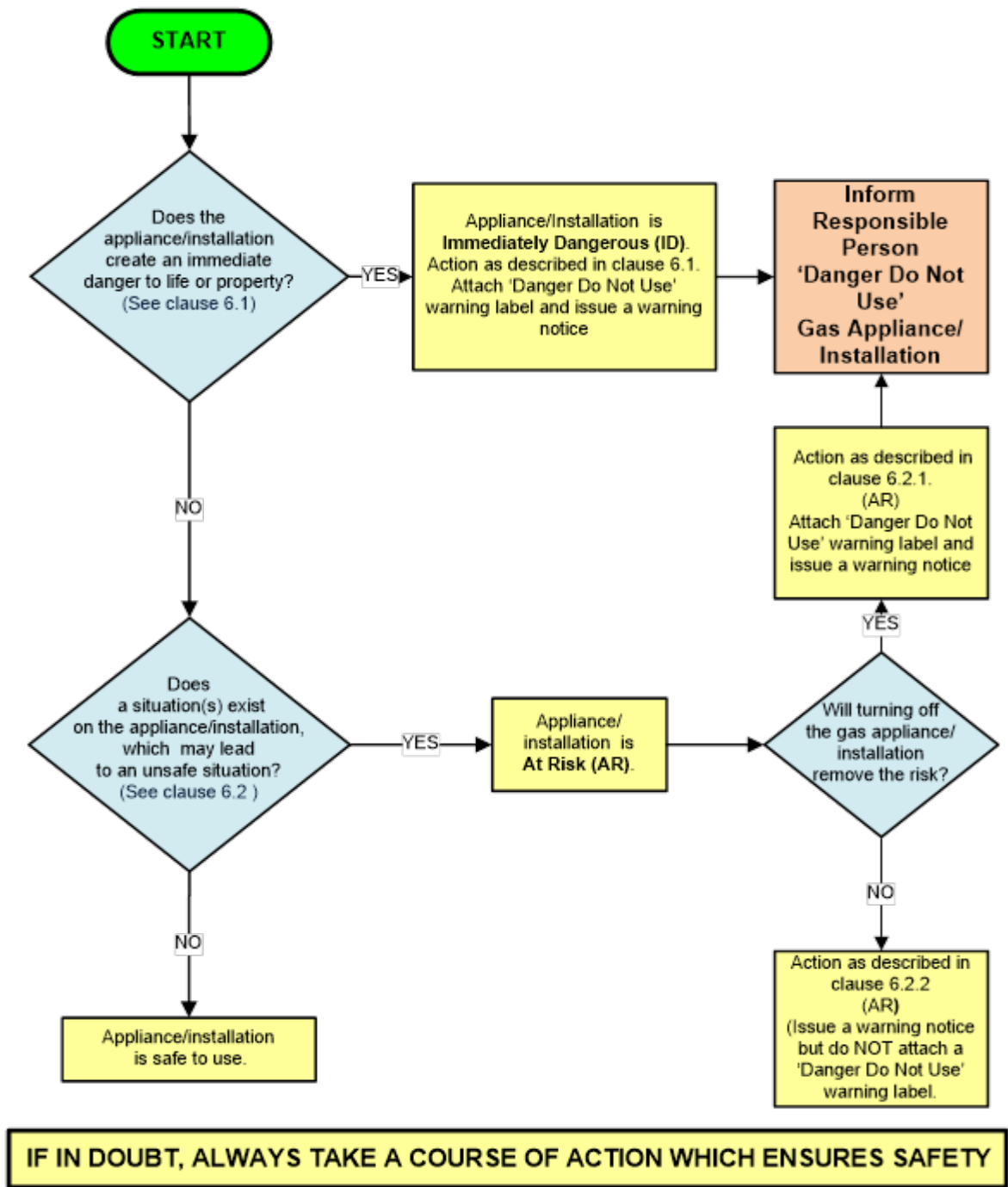


FIGURE 1 – GIUSP APPLIANCE/INSTALLATION RISK CLASSIFICATION PROCESS

SECTION 6: DEALING WITH UNSAFE SITUATIONS

Note: If a gas engineer/business receives a report of a gas escape or fumes when not on site, it requires reporting to the gas emergency service (see Appendix 4). ESP's have specific training and equipment to attend reported escapes/fumes.

This Procedure gives guidance to competent engineers regarding the categorisation of unsafe situations. It contains the most common examples of situations that an engineer is likely to encounter. However, Table 1 is not exhaustive and individual circumstances may require different actions to be taken. This includes multiple defects which, on their own or in smaller numbers, would not be deemed safety related but which may be safety related when added together. Engineers are required to exercise engineering judgement within their area of competence and where there is doubt, seek further guidance. In preparing Table 1, the following logic has been applied when deciding the category. This forms the basic approach to any unlisted situation:

- **Immediately Dangerous (ID)** – Is a dangerous appliance/installation which if left connected to a gas supply is an immediate danger to life or property. Examples of this are combustion products entering the room, and gas escapes
- **At Risk (AR)** – Is a potentially dangerous appliance/installation where one or more faults exist and which, as a result, may in the future constitute a danger to life or property. An example of this is inadequate ventilation.

6.1 IMMEDIATELY DANGEROUS (ID) APPLIANCES/INSTALLATIONS

An ID appliance/installation is one which is an immediate danger to life or property.

Broadly, these will be appliances/installations that fail tightness tests, appliances that fail spillage tests, or appliances which have serious flueing and/or ventilation and/or combustion deficiencies.

Some ID situations will meet the criteria of RIDDOR and will require reporting (see clause 8.3).

With the gas user/responsible person's agreement, the engineer shall make every endeavour to rectify the situation(s) and make the appliance/installation safe to use at the time of the visit. Where this is not possible, the following actions shall be taken:

- a) Explain to the gas user/responsible person:
 - that the appliance/installation is Immediately Dangerous
 - why the appliance/installation is Immediately Dangerous
 - that the appliance/installation **MUST NOT BE USED**
 - that the appliance/installation must be disconnected from the gas supply until the situation has been rectified and that further use would contravene the law e.g., GS(I&U)R Regulation 34.
- b) With the permission of the gas user/responsible person, immediately disconnect and seal the gas supply to the appliance/installation with an appropriate fitting.

If the gas user/responsible person refuses to allow disconnection, endeavour to turn off the appliance/installation and:

- for natural gas, make immediate contact with the Gas Emergency Contact Centre and obtain a job reference number from the operator and the time of the contact for record purposes
- for LPG, make immediate contact with the Gas Supplier and obtain a job reference number from the operator and the time of the contact for record purposes.

In both cases explain the course of action taken and the reason why the situation is considered to be Immediately Dangerous (see contact details of Gas Emergency Service Providers and Gas Suppliers in Appendix 4 Table 2).

Note: Where reasonably practicable the engineer ought to remain on site/in the vicinity to liaise with the ESP to explain the risks. As the situation is classified immediately dangerous the ESP will attend within an hour.

- c) Where the gas user/responsible person is not present, it is recommended that the appliance/installation be disconnected and sealed from the gas supply with an appropriate fitting. However, in non-domestic premises see clause 3.6.
- d) Attach a "DANGER DO NOT USE" label to the appliance/installation in a prominent position. Where an appliance is concealed, fit an additional "DANGER DO NOT USE" label in a prominent position e.g., on a compartment door (an example of a "DANGER DO NOT USE" label is shown in Figure 2).



Recommended minimum size A7 (105 mm X 74 mm)

FIGURE 2 - EXAMPLE OF A "DANGER DO NOT USE" LABEL

- e) Complete a "warning notice" which shall emphasise the words "DANGER DO NOT USE". Regardless of the format used, obtain a signature from the gas user/responsible person as both a record of receipt and understanding. Before leaving site, you shall issue a copy to the gas user/responsible person and keep a copy for your records. If no one is present, leave a copy on site to alert any future user to the danger (see clause f) if the user is not the owner/responsible person.

- f) Clearly indicate on the “warning notice” the type of fault and action taken and any remedial action required:
- if the gas user/responsible person refuses to sign the “warning notice”, record this detail
 - if the gas user/responsible person is not the owner of the appliance/installation, also provide details of the unsafe situation in writing to the owner, e.g., landlord or managing agent.

Note: The Gas Emergency Contact Centre is likely to require the following information from any person making a request for a disconnection:

- *confirmation that it is an Immediately Dangerous situation*
- *the name of the person reporting, the Gas Safe Register registration number of the business and the engineer’s individual Identification number*
- *the name of the responsible person for the property*
- *the address at which the Immediately Dangerous situation exists*
- *details of the Immediately Dangerous situation*
- *the type of appliance/installation*
- *the location within the property.*

Gas engineers, for their own records, are to ask for and document the Gas Emergency Contact Centre’s reference number for the call.

6.2

AT RISK (AR) APPLIANCES/INSTALLATIONS

An AR appliance/installation is one which is potentially dangerous i.e., where one or more faults exist and which, as a result, may in the future constitute a danger to life or property. In general, the appliance/installation should be turned off with the responsible person’s permission to make the situation safe and a “DANGER DO NOT USE” label attached.

However, there are some exceptions where turning off the appliance/installation will not make the situation safer and shall be referred to a responsible person/organisation for resolution e.g., built over PE gas service pipes and LPG bulk storage vessels incorrectly sited. These exceptions do NOT require a “DANGER DO NOT USE” label to be attached and are detailed in Table 1 using *Italic* typeface.

When an AR situation is encountered, there are two distinct courses of action to be taken by the engineer dependant on whether their actions on site can immediately improve the safety of the situation. These courses of actions are:

- Where the risk can be removed by turning off the gas (follow clause 6.2.1 and any specific information given in Table 1)
- Where it is not possible to make the situation safer by turning off the gas at the time, refer the matter to a responsible person/organisation for resolution (follow clause 6.2.2 and any specific information given in Table 1).

6.2.1 **At Risk appliances/installations that shall be turned off to remove the risk and a "DANGER DO NOT USE" label attached**

With the gas user/responsible person's agreement, the engineer shall make every endeavour to rectify the situation(s) and make the appliance/installation safe to use at the time of the visit. Where this is not possible, the following actions shall be taken:

- a) Explain to the gas user/responsible person:
 - that the appliance/installation is At Risk
 - why the appliance/installation is At Risk
 - that the appliance/installation could become dangerous at any time during use
 - not to use the appliance/installation until the situation has been rectified.
- b) With the permission of the gas user/responsible person, immediately ▶'TURN OFF' the gas supply to prevent the operation of the appliance and/or installation.

TURN OFF in the following order

1. Turn off gas isolation valve – only where this is not possible move to option 2;
 2. Remove electrical fuse (turning down of room thermostats or turning clock to off is not acceptable) – only where this is not possible move to option 3;
 3. Turn off appliance control and affix warning label to the appliance gas control. ◀
- c) Where the gas user/responsible person is not present, it is recommended that the gas supply to the appliance/installation is turned off. However, in non-domestic premises (see clause 3.6).
 - d) Attach a "DANGER DO NOT USE" label to the appliance/installation in a prominent position. Where an appliance is concealed, attach an additional "DANGER DO NOT USE" label in a prominent position e.g., on a compartment door.
 - e) Complete a "warning notice" which shall emphasise the words "DANGER DO NOT USE". Regardless of the format used obtain a signature from the gas user/responsible person as both a record of receipt and understanding. Before leaving site, you shall issue a copy to the gas user/responsible person and keep a copy for your records. If no one is present leave a copy on site to alert any future user to the danger (see clause f), if the user is not the owner/responsible person.
 - f) Clearly indicate on the "warning notice" the type of fault, action taken, and any remedial action required.
 - g) If the gas user/responsible person refuses to allow the installation/appliance to be turned off, sign the "warning notice" or they are not present, record the details.
 - h) If the gas user/responsible person is not the owner of the appliance/installation, also provide details of the unsafe situation in writing to the owner, e.g., landlord or managing agent.

6.2.2 **At Risk installations where turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT required**

In a limited number of cases, turning off the installation will not remove the risk. Table 1 includes examples of these situations and are detailed using *Italic* typeface.

In such instances, the engineer shall take the following actions:

- a) Explain to the gas user/responsible person why the installation is At Risk and why turning off will not reduce the risk.
- b) Do not attach a "DANGER DO NOT USE" label.
- c) Complete a "warning notice" which shall emphasise who the gas user/responsible person should contact (as identified in Table 2) for further investigation. Ask the gas user/responsible person to sign it as a record of receipt. Give or leave a copy with the gas user/responsible person and keep a copy for your records.
- d) Clearly indicate on the "warning notice" the type of fault.
- e) If the gas user/responsible person refuses to sign the "warning notice" or they are not present, record this detail.
- f) If the gas user/responsible person is not the owner of the appliance/installation, also provide details of the unsafe situation in writing to the owner, e.g., landlord or managing agent.

6.2.3 **Additional guidance for ESP engineers attending reports of fumes**

When an ESP engineer (or LPG Supplier's emergency response engineer) is called to a report of fumes, a visual inspection of the gas appliances in the property shall be carried out. Where no obvious unsafe situations are identified, a "DANGER DO NOT USE" label shall be attached to all appliances and with the user's permission, all appliances shall be turned off.

ESPs have their own procedures for dealing with CO alarms activated due to reasons other than the presence of CO e.g., end of life or battery failure.

The warning notice shall state:

"Appliances have been visually inspected by an emergency service engineer who cannot confirm that they are safe to use. The appliances should not be used until they have been checked by a Gas Safe registered business".

SECTION 7: GAS INCIDENTS

A gas incident is defined as fire, explosion, or exposure to carbon monoxide which has resulted in death, unconsciousness, or persons being taken to hospital, or significant property damage rendering either part, or the whole property uninhabitable.

Incidents can be encountered in one of two ways. The attending engineer shall follow the actions detailed in the relevant clause:

- first person on site (see clause 7.1)
- attending site where it is suspected that a gas incident may have occurred (see clause 7.2).

7.1 FIRST PERSON ON SITE

Where engineers encounter a gas incident, it is extremely important that the incident scene is not disturbed so as to preserve evidence for any future investigation. However, if safe to do so, they shall make safe. The person on site shall immediately contact:

- the emergency services, where necessary
- the ESP for Natural Gas or the supplier for LPG (see clause 3.5) – contact details of Gas Emergency Service Providers and Gas Suppliers (see Table 2) – and informing them of the incident.

In non-domestic premises outside the scope of GS(I&U)R, the responsible person has to take the decision whether or not to shut down the installation or process (see clause 3.6).

It is important to record all actions undertaken as they will assist those parties involved in any subsequent incident investigation.

Note: For further guidance on RIDDOR reporting requirements, see Section 8.

7.2 ATTENDING A SITE WHERE IT IS SUSPECTED THAT A GAS INCIDENT MAY HAVE OCCURRED

Engineers attending a site following a suspected gas incident shall establish if an incident (as defined above) has occurred. This can be done by:

- questioning the gas user/responsible person
- checking the installation/site for any relevant warning label(s), notices, or documentation and establishing the reason for their presence.

If working at a site where it is known that there has been a gas incident, the engineer shall not carry out any work other than making the installation safe without first liaising with the HSE and the Gas Supplier to ensure any investigation into the incident is complete.

SECTION 8: RIDDOR, UNSAFE GASWORK AND THEFT OF GAS REPORTING

8.1 GENERAL PRINCIPLES

The following guidance applies to Great Britain (England, Scotland and Wales). Other geographical areas may have similar reporting requirements.

There is a requirement under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) for certain types of injuries and dangerous gas fittings to be reported to the HSE.

Note: One of the purposes of RIDDOR regulation 11 is to allow HSE to assess whether it needs to investigate. Photographic evidence may assist in any subsequent investigation of RIDDOR.

8.2 WHAT TO REPORT UNDER RIDDOR 11(1) – GAS INCIDENT

RIDDOR regulation 11(1) applies when someone has died, been unconscious, or taken to hospital in connection with gas as a result of carbon monoxide (CO) poisoning, exposure to un-burnt gas, fire and/or explosion incidents. Incidents where people have taken themselves to hospital, or have been taken to another medical facility, are not reportable.

The duty to report under regulation 11(1) rests solely with the conveyor of Natural Gas or the filler, importer, or supplier (except retail supplier) of LPG.

Note: See also Section 7 – Gas Incidents.

8.3 WHAT TO REPORT UNDER RIDDOR 11(2) – DANGEROUS GAS FITTINGS

RIDDOR regulation 11(2) requires registered gas businesses/engineers to report any gas fittings (including appliances and flues or ventilation used with appliances) which are dangerous to such an extent they have caused or are likely to cause:

- death
- loss of consciousness
- taking to hospital of a person;

due to the design, construction, manner of installation, modification, or incorrect servicing of the gas fitting that could or has resulted in an accidental leakage of gas, incomplete combustion of gas or inadequate removal of products of combustion of gas. This is commonly referred to as poor workmanship or design.

A flow chart of the process is contained in Appendix 7.

Note 1: Where an engineer finds a dangerous gas fitting and repairs it at the same time there is still a requirement for it to be reported.

*Note 2: For further guidance on RIDDOR 11(2) reporting, see the relevant version of Technical Bulletin 002 at:
<https://engineers.gassaferegister.co.uk> - login and visit the Technical Information area.*

8.4 **ID SITUATIONS NOT REPORTABLE UNDER RIDDOR 11(2)**

To be RIDDOR reportable, the criteria of 11(2) has to be met. Most RIDDOR situations are likely to be classified as ID. Some ID situations are not reportable under RIDDOR, even when due to poor workmanship or design. These situations can be reported to Gas Safe Register (GSR) online (see clause 8.6).

Also, some gas fittings that are dangerous due to a lack of maintenance are not required to be reported under RIDDOR, even if they are found in rented accommodation (landlords have duties to maintain gas appliances, flues and pipework in a safe condition). However, if fittings are found (which include appliances by definition) in rented accommodation or commercial installations that are dangerous due to lack of maintenance, you can send details to HSE as a concern to: <https://www.hse.gov.uk/contact/tell-us-about-a-health-and-safety-issue.htm>. HSE will then decide whether or not to investigate these matters further.

Additionally, dangerous non-gas safety defects are generally not reportable. Examples include damaged or inappropriate electrical connections and hot water cylinders without pressure relief.

8.5 **WHEN AND HOW TO REPORT UNDER RIDDOR**

For:

RIDDOR 11(1) – notify HSE without delay (i.e., within 2 hours of attending the incident) and send online report within 14 days of incident.

RIDDOR 11(2) – send online report to HSE within 14 days of discovery.

Online reports should be submitted via HSE’s RIDDOR web site at:

(<http://www.hse.gov.uk/riddor/report.htm>). The web site provides a telephone number for reporting RIDDOR 11(1) deaths and injuries.

8.6 **HOW TO REPORT UNSAFE SITUATIONS DUE TO POOR WORKMANSHIP WHICH ARE NOT REPORTABLE UNDER RIDDOR**

Gas related unsafe situations that do not meet the requirements of RIDDOR can be reported to Gas Safe Register online, see:

<https://www.gassaferegister.co.uk/engineer/resource-hub/gas-industry-unsafe-sits/>

Or they can be reported to HSE online, see:

<https://www.hse.gov.uk/contact/tell-us-about-a-health-and-safety-issue.htm>

A flow chart of the process is contained in Appendix 7.

8.7 **THEFT OF GAS/METER TAMPERING/INTERFERENCE OF AN LPG VESSEL**

Where theft of Natural Gas is suspected/found, engineers are advised to either follow their internal company procedures or formally report and record these matters. To report any issues directly and anonymously, please call Stay Energy Safe on 0800 023 2777 or provide notification by contacting <https://www.stayenergysafe.co.uk/>

Where the engineer is suspicious of or finds a theft of liquefied petroleum gas or unauthorised interference with an LPG vessel, they are advised to contact the LPG supplier (refer to Appendix 4, Table 2 for where to find contact details).

SECTION 9: TABLE 1 – GIVING GUIDANCE ON PARTICULAR SITUATIONS AND HOW TO CATEGORISE THEM

9.1 INTRODUCTION

►►IGEM G11 is a guidance document which provides an agreed industry approach on how those working on gas installations may comply with the requirements of the law.◀◀

Table 1 contains examples of the types of situations which are ID or AR.

It contains the most common examples of situations that an engineer is likely to encounter.

Table 1 is not exhaustive and individual circumstances may require different actions to be taken. Therefore, engineers shall exercise engineering judgement and be able to justify their classification rationale based on the situation on site. Actions should be within their area of competence and where there is doubt, seek further guidance.

Guide to the column descriptions used in Table 1

SITUATION	CAT	NOTES
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SITUATION
Describes the situation discovered.

NOTES
This gives additional guidance including actions that may be required on site to protect life and/or property and ensure that legal requirements are met.

CATEGORY
Categories in which unsafe situations exist:

- ID** – **Immediately Dangerous** appliance/installation (see Sub-Section 6.1 for required actions)
- AR** – **At Risk** appliance/installation, for most of which action can be taken to make the situation safe while recognising some situations where turning off the appliance/installation will not remove or reduce the risk but must be referred to a responsible person/organisation for resolution. Situations where turning off will not remove or reduce the risk are detailed in **Table 1** using ***Italic*** typeface (see Sub-Section 6.2 for required actions).

<p>When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:</p> <p>1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), <u>AND</u></p> <p>2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.</p> <p>Note: See Section 8.6 for all other reporting routes.</p>			
SITUATION		CAT	NOTES
1. GAS ESCAPES AND FUMES			
1.1	From bulk storage vessel or cylinder installation.	ID	Contact the Gas Emergency Contact Centre/LPG Supplier (see Table 2).
1.2	Gas installation; 1. Fails a tightness test. 2. Passes a tightness test but there is a smell of gas.	ID	In situation 2 for Natural Gas installations – Call the Gas Emergency Contact Centre. LPG installations – Call the Gas Supplier, or the Gas Emergency Contact Centre. (for contact details see Table 2).
1.3	Fire and/or explosion caused by gas escapes.	ID	Report to the Gas Emergency Contact Centre or LPG Supplier as appropriate (see Table 2).
1.4	Reports of fumes or CO alarm activation ➤caused by spillage, leakage or re-entry of products of combustion◀. 1. Flued appliances: <ul style="list-style-type: none"> ● Evidence of spillage or leakage of products of combustion (with no evidence the issue has been corrected) ● Where an alarm has activated or ill health symptoms experienced ➤and the flue termination is located in position that could allow products of combustion to enter the property◀ 	ID	<p>➤Greater guidance around the actions when attending such reports can be found in IGEM G/11 Supplement 1. ◀</p> <p>If anyone appears to be unwell with symptoms that might be caused by exposure to CO, advise that immediate medical attention is sought and make the gas installation safe.</p> <p>Even if there is no evidence of ill health, or measured CO levels are below 10 ppm, further investigation is required to confirm the gas appliance is safe.</p> <p><i>Note 1: CO can be generated from sources other than gas appliances e.g., solid fuel and oil-fired appliances, or internal combustion engines. Discuss the safest course of action with the gas user/responsible person and advise them to contact a competent installer via the appropriate advisory body given below.</i></p> <p><i>Note 2: Also consider additional sources of fumes. These may include migration from other properties, damaged appliance seals and leakage from condensate drains.</i></p>

When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:

- 1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), AND**
- 2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.**

Note: See Section 8.6 for all other reporting routes.

SITUATION	CAT	NOTES
<ul style="list-style-type: none"> ● Confirmed re-entry of products of combustion giving rise to ambient CO levels in the building of 10 ppm or greater. <p>2. Flueless appliances:</p> <ul style="list-style-type: none"> ● Evidence of poor combustion occurring. 	ID	<p>➤ Greater guidance around the actions when attending such reports can be found in IGEM G/11 Supplement 1. ◀</p> <p>If anyone appears to be unwell with symptoms that might be caused by exposure to CO, advise that immediate medical attention is sought and make the gas installation safe.</p> <p>Even if there is no evidence of ill health, or measured CO levels are below 10 ppm, further investigation is required to confirm the gas appliance is safe.</p> <p><i>Note 1: CO can be generated from sources other than gas appliances e.g., solid fuel and oil-fired appliances, or internal combustion engines. Discuss the safest course of action with the gas user/responsible person and advise them to contact a competent installer via the appropriate advisory body given below.</i></p> <p><i>Note 2: Also consider additional sources of fumes. These may include migration from other properties, damaged appliance seals and leakage from condensate drains.</i></p>

- CO is from an oil-fired appliance, contact OFTEC on 0845 658 5080, or www.oftec.co.uk for further advice
- CO is from a solid fuel burning appliance, contact The Solid Fuel Association on 0845 601 4406, or www.solidfuel.co.uk for further advice
- CO is from a source other than an appliance, e.g., a landfill site, contact the local authority Environmental Health department for further advice.

If drainage is the suspected source, contact the local water undertaking.

When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:			
1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), AND			
2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.			
Note: See Section 8.6 for all other reporting routes.			
SITUATION	CAT	NOTES	
1.5	ID	Where no work is being undertaken on an appliance but there are visual signs of spillage or leakage of products of combustion from the appliance and/or chimney/flue (and there is no evidence that the problem has been corrected).	
2. METER INSTALLATION AND PRESSURE REGULATION			
Note: To report meter tampering or theft of Natural Gas call 0800 023 2777 or by contacting www.stayenergysafe.co.uk (see clause 8.7 page 17). For tampering of an LPG vessel gas contact the supplier (see clause 8.7 page 17).			
2.1	ID	Pressure regulator not installed at primary meter, or the regulator installation is not suitable for the supply. Advise the responsible person to contact the Gas Supplier (identified from customer bills). <i>Note: Where a 1st family gas e.g., LPG/Air is in use, there may be no requirement for a meter regulator (in this case, check with the Gas Supplier).</i>	
2.2	ID	Incorrect gas pressure at the outlet of the primary meter installation which affects the safe operation of any appliance e.g., combustion and/or flame stability. Notify the Gas Emergency Contact Centre (see contact list in Table 2).	
2.3	ID	LPG installation with high or low operating pressure affecting the safe function of a gas appliance caused by: <ol style="list-style-type: none"> 1. Pressure regulator fault 2. Vessel off-take capacity exceeded 3. Service pipework undersized or blocked. Inform the Gas Supplier (see contact list in Table 2).	

<p>When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:</p> <p>1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), <u>AND</u></p> <p>2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.</p> <p>Note: See Section 8.6 for all other reporting routes.</p>			
SITUATION	CAT	NOTES	
<p>2.4</p> <p>Medium or higher pressure fed regulator relief valve and/or vent pipe:</p> <ol style="list-style-type: none"> 1. discharging continually while gas is being used by consumer 2. blocked on an NG installation of capacity not exceeding 6 m³/h or on an LPG installation of any capacity 3. discharging in an unsafe location 4. terminating in an unsafe location but not discharging. 	<p>ID</p> <p>ID</p> <p>ID</p> <p>AR</p>	<p>For situations 1 and 2, notify the Gas Emergency Contact Centre (see contact list in Table 2). For situations 3 and 4, advise the responsible person to contact the Gas Supplier (identified from customer bills).</p> <p>For a blocked relief valve/vent on a larger NG installation, these include a slam-shut valve that will shut off the gas supply in the event of a fault when the vent is blocked, so they are not unsafe. Some domestic-sized installations do not include a slam-shut valve. In any event, always attempt to clear any blockage otherwise notify the gas supplier.</p> <p>For situations 3 and 4, unsafe vent termination locations are those that do not comply with the appropriate Standard.</p>	
<p>2.5</p> <p>Meter and/or regulator showing significant signs of damage from, for example:</p> <ol style="list-style-type: none"> 1. Corrosive atmosphere 2. Mechanical damage 3. Contact with electrical equipment. 	<p>AR</p>	<p>For primary meters and/or regulators, advise the responsible person to contact the Gas Supplier (identified from customer bills), (see contact list in Table 2).</p> <p>For secondary meters, inform the "Responsible Person".</p>	
<p>2.6</p> <p>Pre-payment primary or Smart meter operating in pre-payment mode, supplying a secondary meter or separate individual premises within the building.</p>	<p>AR</p>	<p>Contact the Gas Supplier or responsible person to have pre-payment meter changed to a credit meter.</p>	

When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:			
<p>1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), AND</p> <p>2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.</p> <p>Note: See Section 8.6 for all other reporting routes.</p>			
SITUATION		CAT	NOTES
2.7	LPG Regulator located within a building and fitted with a limited capacity relief device not piped directly to a safe position outside the building.	AR	Safe position means away from sources of ignition and points of re-entry.
2.8	<p>➤➤Pathway for gas to enter property from meter box e.g.,</p> <p>1. Installation pipework within the meter box entering the property without a sleeve, or the sleeve is not sealed.</p> <p>2. Damaged box creating a pathway for gas to enter property. ◀◀</p>	AR	<p>➤➤Where practical, seal any unsealed sleeve, or alternatively advise the gas user/responsible person that pipework has to be sleeved and sealed</p> <p>Where practical, repair/seal a damaged meter box. Where this cannot be achieved advise the gas user/responsible person. Where a pathway exists for gas to enter the property, ensure the gas supplier is informed. ◀◀</p>
2.9	Medium pressure (or higher) fed meter installation located within a domestic premise.	AR	In all cases inform the relevant Gas Transporter, or Gas Supplier, as appropriate, who will send a competent person to site to undertake further investigation. For further guidance, see Gas Safe Register Technical Bulletin 003.
2.10	Installation pipework and/or equipotential bonding cable entering property from within a meter box via rear exit meter box spigot route where the gas service/service pipework is medium pressure fed (e.g., BS 6400-2 (NG) BS 6400-3 (LPG)).	AR	For further guidance see Gas Safe Register Technical Bulletin 004.
3. PIPEWORK			
3.1	Pipework with an open end, connected to a gas supply.	ID	Seal all open ends with an appropriate gas fitting.

When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:

- 1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), AND**
- 2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.**

Note: See Section 8.6 for all other reporting routes.

SITUATION		CAT	NOTES
3.2	Pipework and/or fittings of inappropriate material for purpose e.g., plastic water pipe or hose pipe.	ID	It is accepted that situations such as this pose a very high risk of a serious incident occurring.
3.3	In an emergency situation (e.g., gas escaping), where there is restricted access, or there is not a handle fitted to the ECV.	ID	Turn off all appliances and notify the Gas Emergency Contact Centre (see contact list in Table 2). In the case of LPG, notify the Gas Supplier.
3.4	Undersized pipework proved to be affecting the safe operation of any appliance.	ID	e.g., incomplete combustion.
3.5	In a non-emergency situation, where there is restricted access, or there is not a handle fitted to the ECV.	AR	Notify the responsible person that access to, and a means to operate the ECV is required by law. For situations where no handle is present notify the Gas Emergency Contact Centre. In this case, where the situation is classified as At Risk, <i>turning off will NOT remove the Risk and a "Danger Do Not Use" label is NOT to be attached.</i>
3.6	No AECV at point of entry to property where one is required and where there is no adequate access to ECV.	AR	Notify the responsible person that an AECV is required and in its absence access to the ECV is required by law.
3.7	"Let-by" of ECV without a smell of gas.	AR	Notify the Gas Emergency Contact Centre or in the case of LPG notify the Gas Supplier (see contact list in Table 2). Make safe as described in the IGEM/UP/1 series of procedures.
3.8	"Let-by" of AECV without a smell of gas.	AR	Maintain or replace AECV.
3.9	Let-by of an MIV (test valve) on a medium pressure fed meter installation which forms part of a tightness test.	AR	Inform the Gas Supplier. In this case where the situation is classified as At Risk, <i>turning off will NOT remove the Risk and a "Danger Do Not Use" label is NOT to be attached.</i>

<p>When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:</p> <p>1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), <u>AND</u></p> <p>2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.</p> <p>Note: See Section 8.6 for all other reporting routes.</p>		
SITUATION	CAT	NOTES
<p>3.10 Pipework suitable for gas used in an inappropriate location and/or situation:</p> <ol style="list-style-type: none"> 1. Installation pipework 2. Service/service pipework. 	AR	<p>For example, PE pipework installed within a building, or PE pipework exposed above ground level without suitable protection.</p> <p>➤For buildings over 18 m high see IGEM/G/5. ◀</p> <p>For situation 2 regarding service/service pipework, see <i>Gas Safe Register Technical Bulletin TB 003</i>.</p> <p>In situation 2 where the situation is classified as At Risk, <i>turning off will NOT remove the Risk and a "Danger Do Not Use" label is NOT to be attached.</i></p>
<ol style="list-style-type: none"> 1. Pipework showing significant signs of damage from, e.g., corrosion or mechanical damage, inadequate support. 2. Pipework where the position or lack of support makes damage and/or accidental release highly foreseeable. 	AR	<p>For downstream installation pipework, and for LPG upstream "service pipework" where there is an upstream isolation valve accessible to the gas engineer (for example the tank valve where a LPG supply serves a single premises), inform the Responsible Person.</p> <p>Pipework should be supported to the appropriate standard.</p> <p>For Natural Gas upstream "service pipe", <i>turning off will NOT remove the Risk and a "DANGER DO NOT USE" label should NOT be attached. Contact the Gas Emergency Contact Centre.</i></p> <p>For LPG upstream "service pipework" where there is no upstream isolation valve accessible to the gas engineer (for example where a LPG network serves multiple premises), <i>turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be attached. Contact the Gas Supplier.</i></p>
<p>3.12 LPG hose insecure, or shows signs of wear, distress or damage e.g., chafing, cuts, splits etc.</p>	AR	<p>Where insecure, secure the LPG hose using suitable clips at both ends.</p> <p><i>Note: Worm drive clips may be acceptable for some hoses. For further guidance, see Gas Safe Register Technical Bulletin 011.</i></p>

When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:

- 1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), AND**
- 2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.**

Note: See Section 8.6 for all other reporting routes.

SITUATION		CAT	NOTES
3.13	Gas pipework located within a cavity wall or void but not within a purpose-designed duct in accordance with appropriate standards.	AR	This does not include un-sleeved pipework which passes directly across a cavity by the shortest possible route, although situation 3.11 in these tables, should also be considered. <i>Note: See also TB 136 for Permali meter boxes.</i>
3.14	Automatic isolation valve (AIV) fitted in supply to appliances without at least one of the following: <ol style="list-style-type: none"> 1. An automatic downstream integrity system check will occur when the AIV activates, or 2. Every appliance has an automatic flame safeguard, or 3. An effective written "safe system of work" procedure is in place for reinstating the gas supply to the appliances 	AR	At least one of the methods has to be available to prevent un-ignited gas being passed through the appliance.
3.15	PE service pipework (LPG) operating above 75 mbar without OPSO protection.	AR	Inform the Gas Supplier. <i>Note: Low pressure pipework operates at up to 75 mbar.</i>

When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:		
<p>1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), AND</p> <p>2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.</p> <p>Note: See Section 8.6 for all other reporting routes.</p>		
SITUATION	CAT	NOTES
3.16	AR	<p>Unprotected means not protected by plastic coating or cathodic protection systems.</p> <p>Overdue replacement means the date for its replacement has passed (under the LPG metallic pipework replacement programme). This date can be obtained from the LPG supplier. Further details are available from HSE Guidance Note INDG428 available via the following link: http://www.hse.gov.uk/pubns/indg428.pdf</p> <p>"The Supplier can confirm whether the premises are "Special risk" domestic premises and further information is available from the Liquid Gas UK guidance / questionnaire available via the following link: https://www.liquidgasuk.org/safety/pipework-safety-check</p>
3.17	AR	<p>For further guidance, see Gas Safe Register Technical Bulletin 003.</p> <p>In the case of pressures exceeding 75 mbar classify as At Risk, turn off (where permission is given) and inform emergency service provider or LPG supplier.</p> <p>In the case of a low pressure fed installation (up to 75 mbar), where the situation is classified as At Risk, <i>turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</i></p>
3.18	AR	<ol style="list-style-type: none"> If supplying a single customer, if possible and with permission from the gas customer, turn off at the tank isolation valve. If a centralised gas storage, inform the Gas Supplier (LPG) and obtain advice.
3.19	(See right)	<p>Leave a bonding notice informing the responsible person that equipotential bonding work should be checked/carried out by an electrically competent person. For further guidance, see <i>Gas Safe Register Technical Bulletin 102.</i></p>

When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:			
1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), <u>AND</u>			
2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.			
Note: See Section 8.6 for all other reporting routes.			
SITUATION		CAT	NOTES
4. AIR SUPPLY (VENTILATION)			
4.1	Open-flued or flueless appliances in a room or internal space requiring purpose-provided permanent combustion air supply where the supply is less than required.	AR	For existing installations, 90% or more of each ventilator requirement is considered acceptable provided the appliance is otherwise operating safely and correctly. For non-domestic situations, seek guidance from the appliance manufacturer or appropriate industry standard such as BS 6644 or IGEM/UP/10. Ventilation provided via a redundant chimney/flue is not regarded as purpose provided ventilation and may affect the safe operation of open-flued appliances.
4.2	Open-flued appliance installed in a compartment requiring purpose-provided permanent high- and low-level air supply where: <ol style="list-style-type: none"> 1. Air supply is at one level only, or 2. Air supply is less than required. 	AR	For existing installations, 90% or more of both high and low ventilator requirement is considered acceptable provided the appliance is otherwise operating safely and correctly. For non-domestic situations, seek guidance from the appliance manufacturer or appropriate industry standard such as BS 6644 or IGEM/UP/10. Ventilation provided via a redundant chimney/flue is not regarded as purpose provided ventilation and may affect the safe operation of open-flued appliances.
4.3	Air supply ventilators for open-flued or flueless appliance, which incorporate gauzes or fly screens or are closable.	AR	Pest control mesh may be found on purpose provided ventilation found in catering establishments or leisure accommodation vehicles which may not be a risk if clean and complying with relevant Standards/Procedures.
4.4	Flueless cookers, installed in a bed/sitting room of volume less than 20 m ³ irrespective of ventilation provision.	AR	
4.5	Flueless appliances installed in a room of inadequate volume irrespective of ventilation provision.	AR	This excludes cookers (see Table 1 Situation 4.4). Refer to relevant Standards and appliance manufacturer's instructions for particular room volume requirements.

When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:

- 1. The situation is as a result of the design, construction, manner of installation, modification or incorrect servicing of the fitting (often referred to as poor workmanship/design), AND**
- 2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.**

Note: See Section 8.6 for all other reporting routes.

SITUATION		CAT	NOTES
4.6	Leisure accommodation vehicles (e.g., static caravan holiday homes) and/or residential park homes with the air space beneath enclosed (unventilated skirt) creating an unventilated void.	AR	Ventilation of the under-floor void is needed to disperse any leakage of gas. For further information on the ventilation under park homes, lodges and holiday caravans, see HSE advice at following link: https://www.hse.gov.uk/gas/assets/docs/ventilation.pdf
4.7	Incorrectly configured mechanical ventilation systems.	AR	e.g., mechanical extract ventilation with natural draught inlet provision. This does not apply to commercial catering (see Table 1 Situation 15).
4.8	Any mechanical ventilation system for the purpose of providing combustion ventilation not interlocked to the appliance gas supply.	AR	Refer to relevant Standards and appliance manufacturer’s instructions for particular mechanical ventilation requirements. This does not apply to commercial catering (see Table 1 Situation 15).
4.9	Installation pipework located within an unventilated duct or void.	AR	
4.10	Unventilated meter installation on non-domestic premises. ➤See also 4.10a◀	AR	➤The ventilation for certain meter installations may be met where they are located in◀ habitable areas where the ventilation requirements meet the specified requirements within the relevant Building Regulations and second tier documents for the geographical area. ➤If the meter installation is located in any form of enclosure in that area that enclosure shall be ventilated to the appropriate standard. ◀

When considering whether an unsafe situation is RIDDOR reportable the following criteria need to be met:

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- 2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.**

Note: See Section 8.6 for all other reporting routes.

SITUATION		CAT	NOTES
4.10a	<p>►Unventilated meter room/enclosure containing multiple meter installations e.g., meter banks in flats◀</p>	AR	<p>►Turning off the individual ECV will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</p> <p>Inform the Gas User/responsible person for the property where you are working.</p> <p>Due to the wider risks posed by multiple meter installations, the importance of notifying the building owner and the gas supplier shall be emphasised on the warning notice.</p> <p>Meter room/enclosure ventilation requirements are detailed in the appropriate Standards, e.g., IGEM/G/5. ◀</p>
4.11	LPG service pipework located within an unventilated duct or void.	AR	Inform the Gas Supplier. <i>Turning off the ECV will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</i>

5. CHIMNEY/FLUES (OPEN-FLUES)

5.1	<p>Where the clearances around an open-flued appliance do not comply with the manufacturer's minimum requirements:</p> <ol style="list-style-type: none"> 1. Appliance showing signs of distress. 2. Appliances not showing signs of distress. 	<p>ID</p> <p>AR</p>	<p>Where the appliance is otherwise operating safely and manufacturer's instructions are not available to specify minimum clearances, a clearance of at least 5 mm all around the appliance is typically adequate in domestic situations.</p>
5.2	Appliance down draught diverter is found to be completely enclosed or missing.	AR	

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Note: See Section 8.6 for all other reporting routes.

SITUATION		CAT	NOTES
5.3	Incomplete or damaged chimney/flue or inadequate fixings and/or sealing, but where combustion products do not enter the building.	AR	Examples include missing chimney/flue terminal, inadequate support, missing gas fire closure plate, or a porous chimney/flue external to the building.
5.4	Where two or more appliances are connected to one chimney/flue: <ol style="list-style-type: none"> 1. If one of the appliances has no flame supervision device fitted. 2. If the appliances are in separate rooms ventilated from different sides of the building. 3. If the chimney/flue is not designed for the purpose. 	AR	
5.5	Natural draught, wall-adjacent, or wall-faced termination.	AR	Not acceptable for <u>ANY</u> natural draught open-flued appliance installation.
5.6	Manual damper in place and not secured in the open position (domestic appliances).	AR	
5.7	Automatic chimney/flue damper not interlocked to appliance gas supply.	AR	
5.8	Existing open chimney/flue system installation terminating in a prohibited zone.	AR	

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Note: See Section 8.6 for all other reporting routes.

SITUATION		CAT	NOTES
5.9	Existing open chimney/flue system installation with one or more defects likely to affect the safe and effective performance of the chimney/flue system.	AR	<p>Examples of installation defects likely to affect open chimney/flue performance include, but are not limited to:</p> <ul style="list-style-type: none"> inadequate vertical rise to first bend inadequately supported 90° bends or horizontal runs non-compliant termination positions incorrect use of chimney/flue material e.g., exposed chimney/flue liner inadequately sized chimney/flue pipe unsuitable terminal fitted. <p>Where one or more such defect(s) is/are identified, the engineer shall assess the safety of the gas installation and decide whether the deficiencies are so serious to warrant the installation being classified as AR.</p>
5.10	Mechanically assisted flue/chimney system not interlocked to the appliance gas supply.	AR	See also Situation 15 - CATERING.
5.11	<p>Fan dilution systems (plant/boiler room at fan dilution discharge):</p> <ol style="list-style-type: none"> 1. CO₂ concentrations above 1% or 2. CO concentrations in excess of 50 ppm. 	AR	

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SITUATION		CAT	NOTES
6. CHIMNEY/FLUES (ROOM SEALED)			
6.1	Chimney/flue terminating into an internal space e.g., conservatory.	ID	
6.2	Leakage of products of combustion from room-sealed chimney system e.g., evidence of products of combustion; leakage from the chimney/flue system; appliance or condensate air break.	ID	Where the affected property is one of a number of similar properties in a block or complex, include the approximate number of properties in the development in the summary of the report. Also classify as ID signs of distress to material enclosing a concealed chimney/flue system with no evidence of subsequent corrective remedial work.
6.3	Chimney/flue terminating into a semi-enclosed area e.g., covered passageway or ginnel. Following an assessment in accordance with guidance given in TB 007: 1. It is found that combustion products are entering the building. 2. There is a risk that combustion products may enter the building.	ID AR	Chimney/flue termination positions in semi-concealed locations are considered to constitute an elevated level of risk. For industry guidance on how to classify chimney/flues terminating in covered passageways, or ginnels, see <i>Gas Safe Register Technical Bulletin 007</i> .
6.4	Incorrect use of a "flue gas management kit" to extend a fan assisted room sealed chimney/flue duct outlet to outside, where the air intake is enclosed within a building.	AR	e.g., where a conservatory has enclosed the original chimney/flue terminal position.

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Note: See Section 8.6 for all other reporting routes.

SITUATION		CAT	NOTES
6.5	No means of examining a room-sealed concealed chimney/flue system in accordance with industry guidance to confirm the effectiveness of the chimney/flue system i.e., the lack of appropriate inspection hatches etc.	AR	Risk assess room-sealed boilers served by a concealed chimney/flue system without appropriate means to undertake examination in accordance with the industry guidance to ensure that no immediately dangerous situation exists, see <i>Gas Safe Register Technical Bulletin 008</i> .
6.6	Room-sealed chimney/flue systems which are damaged, insecure, inadequately supported and/or using incorrect jointing methods to such an extent that may cause it to become unsafe and/or a breach of integrity is likely.	AR	Evidence that the chimney/flue system is inadequately supported and/or incorrectly jointed. This includes inadequate clipping, missing clips, screws or sagging, allowing movement of the chimney/flue to such an extent that may cause it to become unsafe and/or a breach of integrity is likely.
6.7	INTENTIONALLY BLANK		

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- 2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.**

Note: See Section 8.6 for all other reporting routes.

SITUATION		CAT	NOTES
7. APPLIANCES (GENERAL)			
7.1	Appliance, which should be flued, but is not flued.	ID	
7.2	Breach of a room-sealed appliance's integrity caused by missing or damaged seals: <ol style="list-style-type: none"> 1. Flue gas analysis sample point cap missing/damaged (regardless of evidence of leakage of products of combustion). 2. Air inlet sample point cap missing/damaged (no evidence of leakage of products of combustion). 3. Grommets forming part of the combustion circuit missing/damaged (no evidence of leakage of products of combustion). 	ID AR AR	Evidence of distress, leakage of condensate or products of combustion, or CO alarm activation, in any situation, shall be treated as ID. Where there is no evidence of distress, leakage of condensate or products of combustion, or CO alarm activation, the situation is not RIDDOR reportable.
7.3	Appliance not suitable for use with the gas supplied.	ID	Refer the Responsible Person to the installer of the appliance. Also report to Gas Safe Register (see Section 8 and Appendix 7).
7.4	Appliance gas controls and safety devices that affect the safe operation of an appliance, which are inoperative, failing to danger, or are disabled.	ID	Examples of devices include flame supervision devices (FSDs), regulators, spillage monitoring devices (e.g., TTBs, ASDs), air pressure switches and high limit thermostats etc.
7.5	Flueless or non-room-sealed appliance in room containing a bath or shower.	ID	This includes cookers etc., installed in a room containing a bath or shower.

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SITUATION		CAT	NOTES
7.6	Failure to achieve satisfactory combustion readings when using an electronic portable combustion gas analyser: <ol style="list-style-type: none"> 1. Flueless appliance 2. Flued appliance. 	ID AR	Combustion readings may include one or more of CO, CO ₂ , and CO/CO ₂ combustion ratios. See specific appliance manufacturer's installation instructions, or BS 7967. ►Where CO ₂ readings are unsatisfactory but are not adversely affecting the CO reading, contact the manufacturer for advice. ◀
7.7	Flueless or flued appliance with visual signs of incomplete combustion at a main burner and/or within the heat exchanger: <ol style="list-style-type: none"> 1. Flueless appliance 2. Flued appliance 	ID AR	For situation 2, if spillage/leakage is evident classify as ID.
7.8	Flueless, or non-room-sealed space heating, or water heating appliance over 14 kW heat input (gross), or under 14 kW heat input (gross) without a built-in atmosphere sensing device, installed in a bedroom or bed-sitting room.	AR	
7.9	Use of an appliance indoors that is designed for outdoor use only.	AR	Use of appliances such as BBQs and patio heaters indoors has resulted in numerous incidents including fatalities. Where permission is obtained, remove appliance to outside. For further information on the safe use of patio heaters, see following link: https://www.liquidgasuk.org/media/DOC5D495CFB4B3A4/Liquid%20Gas%20UK User%20Info_04_July%202019.pdf

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SITUATION		CAT	NOTES
7.10	Evidence of heat damage to an appliance or adjacent combustible material.	AR	Functional checks may be required to determine whether the heat damage is due to the appliance, its manner of installation, or misuse.
7.11	Flexible gas connection to a flued domestic appliance.	AR	This requirement does not apply to gas-fired tumble dryers installed to the requirements of BS 7624.
7.12	Appliance found to be insecure and/or not stable so that it is potentially unsafe.	AR	A stable free-standing cooking appliance using a flexible connection without a stability device secured to the fabric of the building (e.g., stability bracket or chain) would not be classified as AR.
7.13	►An appliance connected to a sealed heating system with no effective pressure relief. ◀	AR	
7.14	LPG appliance with automatic ignition device or a pilot light, installed in a room below ground level, unless open to ground level on at least one side.	AR	It is acceptable to install such appliances in rooms which are basements with respect to one side of the building, but open to ground level on the opposite side.

8. WATER HEATERS

8.1	Flueless or open-flued instantaneous water heating appliance without a built-in atmosphere-sensing device (ASD).	AR	
8.2	Flueless instantaneous water heating appliance installed in a room or internal space of inadequate volume.	AR	
8.3	Flueless water heating appliance supplying hot water outlet(s) not in the same room or space as the appliance.	AR	

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SITUATION		CAT	NOTES
8.4	Flueless water heating appliance without a 5-minute warning label.	AR	
<p>9. SPACE HEATERS (INCLUDING GAS FIRES, DFEs AND CONVECTOR HEATERS)</p>			
9.1	Builder's opening inadequately sealed where combustion products do not enter the building.	AR	There should not be any gaps within the builder's opening other than the fireplace opening and the chimney/flue itself.
9.2	Space heater fitted to "letterbox" opening or with inadequate catchment space where combustion products do not enter the building.	AR	
9.3	No closure plate fitted (where required), or inadequately sealed where combustion products do not enter the building.	AR	
9.4	Space heater fitted over combustible flooring with heat damage to flooring evident.	AR	See also Table 1 Situation 7.10
9.5	Combustible material located within builder's opening and showing signs of heat damage or scorching.	AR	
9.6	Flueless space heater installed in a room or internal space where the air vent is incorrectly positioned.	AR	Refer to manufacturer's installation instructions and BS 5871-4 for correct positioning. For further guidance, see Gas Safe Register Technical Bulletin 088.

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SITUATION	CAT	NOTES
10. OPEN FLUED COMBINED GAS FIRE BACK BOILER/CIRCULATOR UNITS		
10.1	AR	<p>Builder's opening that is not sealed around the chimney/flue liner, cables, water and/or gas pipework.</p> <p>Seal all unsealed openings, i.e., around chimney/flue liner, cables, water and/or gas pipework. The At Risk category is not applicable where the chimney/flue liner and/or chimney annulus alone is not sealed and it cannot practicably be sealed. Providing there is no evidence of spillage or flame reversal and it is otherwise safe and operating satisfactorily, no further action is necessary.</p> <p>For further guidance, see Gas Safe Register Technical Bulletin 009.</p>
11. WARM AIR HEATERS		
11.1	ID	<p>Unsealed plenum or ducting in appliance compartment affecting the safe operation of the appliance.</p> <p>Where an unsealed plenum is encountered which does not affect the safe operation of the appliance, classify the installation as AR.</p>
11.2	AR	<p>Open-flued warm air heater with fan-assisted warm air circulation installed in a compartment without a positive return air connection.</p> <p>Where an open-flued warm air heater with fanned warm air circulation without a positive return air arrangement is encountered, it may be possible to fit a return air duct. Otherwise, consult the appliance manufacturer. In many cases, particularly with older appliances, this will not be possible, in which case advise the gas user/responsible person to replace the appliance.</p>
11.3	AR	<p>Open-flued warm air heater with fan-assisted warm air circulation having an inadequate provision for a return air path.</p>

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SITUATION		CAT	NOTES
12. LIQUEFIED PETROLEUM GAS (LPG) BULK STORAGE VESSELS			
12.1	Vessel located within a building.	ID	Inform gas user/responsible person and inform the Gas Supplier. Record on appropriate job documentation.
12.2	Vessel without a pressure relief valve.	ID	
12.3	Vessel installation without an appropriate regulator.	ID	Inform gas user/responsible person and inform the Gas Supplier. Record on appropriate job documentation.
12.4	Bulk-storage vessel(s) installation without required UPSO and OPSO protection.	AR	Inform the Gas Supplier.
12.5	Vessel that has a liquefied gas level greater than 95%.	AR	Contact the Gas Supplier for advice on action to take.
12.6	Vessel too close to fixed ignition source.	AR	Further guidance is provided in <i>Liquid Gas UK CoP 1 Parts 1, 2 and 4</i> and can be found using the following hyperlink: https://www.liquidgasuk.org/codes/cops <i>Turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</i>
12.7	Vessel too close to a known un-trapped drain and drain cover is not sealed.	AR	Contact, or advise gas user/responsible person to contact Gas Supplier. <i>Turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</i>
12.8	Vessel without a stable base.	AR	
12.9	Large quantities of combustible materials too close to above ground vessel(s).	AR	
12.10	Vessel susceptible to vehicle collision not appropriately protected from vehicle impact (e.g., bollards, kerbstone etc.).	AR	

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SITUATION		CAT	NOTES
12.11	Vessel valves and/or controls which are accessible by the general public.	AR	Contact, or advise gas user/responsible person to contact Gas Supplier. <i>Turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</i>
12.12	Vessel surrounded by excessive vegetation creating a restriction on ventilation and combustion hazard.	AR	Contact, or advise gas user/responsible person to contact Gas Supplier. <i>Turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</i>
12.13	Vessel too close to building that is not acting as a fire wall.	AR	Buildings acting as a fire wall should be imperforate and of 60 minutes fire construction. Further guidance is provided in <i>Liquid Gas UK CoP 1 Parts 1 and 2</i> . Advise gas user/responsible person to contact Gas Supplier. <i>Turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</i>
12.14	Above-ground vessel positioned too close to overhead electrical power lines or cables.	AR	For electrical power lines or cables operating at a voltage of less than 1.0 kV, the vessel(s) should be sited at least 1.5 m from a plane drawn vertically downwards from the power lines or cables. For electrical power lines or cables operating at a voltage of 1.0 kV or greater the distance should be increased to 10 m. Advise gas user/responsible person to contact Gas Supplier. <i>Turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</i>
12.15	Underground vessel(s) in a roadway or vehicular access.	AR	<i>Turning off will NOT remove the Risk and a "DANGER DO NOT USE" label is NOT to be used.</i>

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Note: See Section 8.6 for all other reporting routes.			
SITUATION		CAT	NOTES
13. LIQUEFIED PETROLEUM GAS (LPG) CYLINDERS and LPG CARTRIDGES			
13.1	Vapour off-take cylinder with no regulator fitted.	ID	
13.2	LPG cylinder/cartridge(s) stored in a basement.	AR	Advise gas user/responsible person to move the cylinder/cartridge. Inform gas (cylinder) supplier and/or filler if gas user/responsible person refuses to reposition the cylinder/cartridges(s).
13.3	LPG cylinder/cartridge(s) stored in other inappropriate locations.	AR	Refer to Liquid Gas UK CoP 7 for advice on correct storage of LPG cylinder/cartridge(s). Advise gas user/responsible person to move the cylinder(s). Inform gas (cylinder) supplier if gas user/responsible person refuses to reposition the cylinder/cartridges(s).
13.4	LPG cylinder/cartridge(s) stored or used inappropriately.	AR	Refer to Liquid Gas UK CoP 7, IGEM/G/6, BS 5482 and BS EN ISO 10239, as appropriate. Advise gas user/responsible person to stop using cylinder/cartridge(s) inappropriately. Inform gas (cylinder) supplier if gas user/responsible person refuses to stop storing/using the cylinder/cartridges(s). <i>Turning off may not remove the Risk, in which case a "DANGER DO NOT USE" label is NOT to be used.</i>
13.5	Four or more cylinders connected to an automatic change-over device without OPSO protection.	AR	

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SITUATION		CAT	NOTES
13.6	<p>LPG cylinder on a boat in a location that:</p> <ol style="list-style-type: none"> 1. Is not vapour tight to the craft interior 2. Is accessible from inside the craft interior 3. Does not provide for adequate drainage facilities for LPG to vent directly overboard 4. Has inadequate ventilation direct from outside the vessel. 	AR	For guidance, see BS EN ISO 10239 and/or PD 54823 as appropriate.
13.7	Cylinder(s) not stable.	AR	
13.8	Cylinder regulator fitted at a height below that of the cylinder outlet valve.	AR	
13.9	Existing single stage LPG regulators without OPSO protection where the regulator is known or suspected to be 10 years old or greater, or where such a single stage regulator without OPSO protection exhibiting evidence of significant environmental degradation.	AR	<p>OPSO regulators are recommended for all LPG installations where available. For Further guidance please refer to CGS 39 available at https://www.liquidgasuk.org/media/DOC5F57A5B15247F/Consumer%20Guidance%20Sheet%2039.pdf</p>

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SITUATION	CAT	NOTES	
14. GAS PRESSURE RAISING EQUIPMENT			
14.1	Low-pressure protection not fitted, by-passed, or inoperable.	ID	
14.2	Where required, back pressure protection device not fitted, or if fitted not functioning.	ID	
14.3	Equipment in an inappropriate or inadequately ventilated location or incorrectly installed.	AR	
15. COMMERCIAL CATERING			
15.1	<p>Existing kitchen installation containing gas-fired appliance(s) where there are safety concerns with:</p> <ol style="list-style-type: none"> 1. Fixed ventilation (make up air/air inlet) 2. Mechanical ventilation systems (make up air/air inlet), for example, those with no interlock with the gas supply or those fitted with a manual override 3. Mechanical extraction systems, for example, those with no interlock, those fitted with a manual override or those without the provision for make-up air/air inlet) 	See Notes	<p>Following a risk assessment as set out in the "Risk Assessment Protocol" for dealing with gas-fired catering appliances outlined in <i>IGEM/UP/19 - Application of interlock devices and associated systems used with gas appliance installations in commercial catering</i>, apply the relevant category and actions (ID, AR, or as defined by <i>IGEM/UP/19</i>).</p> <p><i>Note: It may be possible, with permission of the responsible person, to carry out remedial work to reduce risk levels, for example, improve ventilation, service filters/fans etc. or reduce cooking load/isolate appliances.</i></p>

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2. It is dangerous to such an extent it is likely to, or has caused: death, unconsciousness, taking to hospital of a person.			
Note: See Section 8.6 for all other reporting routes.			
SITUATION		CAT	NOTES
	4. Atmosphere readings that indicate excessive levels of carbon dioxide (CO ₂) or other products of combustion (complete or incomplete). Air quality within the working environment e.g., very hot working environment, high levels of condensation, catering staff complaining about the working environment.		
15.2	Appliance with enclosed burner without a flame supervision device (FSD).	AR	This requirement applies to catering appliances with closed burners that were not originally fitted with flame supervision devices (FSD). For appliances originally fitted with FSDs see Table 1 Situation 7.4.

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

A1.1 GLOSSARY

additional emergency control valve (AECV)	A valve, not being the ECV, for shutting off the supply of gas in an emergency, intended for use by a consumer of gas. An AECV may be located within either the meter installation or installation pipework and as such, may not isolate all of the meter installation or consumer’s pipework. (See also Emergency Control Valve (ECV)).
At Risk (AR)	An AR appliance/installation is one where a fault exists and which, as a result, may in the future constitute a danger to life or property.
appliance compartment	An enclosure (not being a habitable space) specifically designed or adapted to house one or more gas appliances only.
appropriate fitting	Fitting which has been designed for the purpose of effecting a gas tight seal in a pipe or other gas way, which achieves that purpose when fitted and is secure, so far as is reasonably practicable, against unauthorised opening or removal.
atmosphere sensing device (ASD)	A device that shuts off the gas supply to an appliance burner before there is a build-up of a dangerous quantity of combustion products in the room concerned (also known as an oxygen depletion system).
bedsitting room	Any room or space used for living and sleeping purposes.
chimney	Structure consisting of a wall or walls enclosing a flue or flues. This includes chimneys of all materials (e.g., metal, masonry, plastic, etc.). It may be either an open flue chimney for use with an open-flued appliance or a room-sealed chimney configuration for use with a room-sealed appliance.
commissioning	Initial start-up of an installation to check and adjust for safe and reliable operation.
conveyor	Person who conveys gas through pipes and the Network and having duties under Gas Safety (Management) Regulations and Pipeline Safety Regulations and who may also hold a Gas Transportation Licence.
disconnect	Prevent the operation of a gas appliance or gas installation through the physical disconnection of the gas supply from the appliance/installation and sealing off the supply using a plug, or cap, or by spading off.
emergency control valve (ECV)	A valve, not being an “Additional Emergency Control Valve” (AECV) for shutting off the supply of gas in an emergency, intended for use by a consumer of gas and being installed at the end of a gas service or gas distribution main. The outlet of the ECV terminates and thus defines the end of the Network.
Emergency Service Provider (ESP)	Emergency Service Providers respond to and make safe all reported gas emergencies, including gas escapes and CO/fumes, as soon as reasonably practicable. Suppliers of LPG have similar duties to those described above. These are covered by GS(I&U)R. Within this procedure LPG supplier’s emergency response are included in the definition of ESP.

factory	The legal definition of “factory” is wide ranging and in addition to manufacturing and/or processing premises includes printing, fruit and vegetable packing, scrap yards, repair workshops (e.g., TV, vehicle), dairies, prison workshops, hospital and other institutional laundries, certain warehouses using mechanical power, power stations etc.
flame supervision device (FSD)	A device that, in response to a signal from the flame detector, keeps the gas supply open and shuts it off in the absence of the supervised flame.
free area	The total area of the individual unobstructed openings of an air vent.
flue	Passage for conveying combustion products to the outside air.
fumes	Products of combustion.
gas appliance	Means an appliance designed for use by a consumer of gas for heating, lighting, cooking or other purposes for which gas can be used but it does not include a portable or mobile appliance supplied with gas from a cylinder, or the cylinder, pipes and other fittings used for supplying gas to that appliance, save that, for the purposes of Regulations 3, 35 and 36 of these Regulations, it does include a portable or mobile space heater supplied with gas from a cylinder, and the cylinder, pipes and other fittings used for supplying gas to that heater.
gas cartridge	Non-refillable container of a capacity between 50 and 1000 ml filled once only with LPG for fuelling portable gas appliances which burn LPG.
gas fitting	<p>“Gas fittings” 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 (other than the purpose of an industrial process carried out on industrial premises), but it does not mean:</p> <ul style="list-style-type: none"> (a) any part of a service pipe (b) any part of a distribution main or other pipe upstream of the service pipe (c) a gas storage vessel, or (d) a gas cylinder or cartridge designed to be disposed of when empty.
gas installation	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 (other than the purpose of an industrial process carried out on industrial premises) and gas storage vessels.
gas user	See “Responsible person”.
ginnel	Covered passageway.
HSE	Health and Safety Executive.
Immediately Dangerous ID	An appliance/installation, which if left connected to a gas supply is an immediate danger to life or property.

installation pipework	Any pipework for conveying gas for a particular consumer and any associated valve or other gas fitting, including any pipework used to connect a gas appliance to other installation pipework and any shut-off device at the inlet to the appliance, but it does not mean: <ul style="list-style-type: none"> a) a service pipe b) a pipe comprised in a gas appliance c) any valve attached to a storage container or cylinder or d) service pipework.
intermediate pressure stage (LPG)	That part of the LPG installation between the outlet of the 1st stage regulator and the inlet of the 2nd stage regulator. For Propane, the pressure will be in the region of 750 mbar. Also known as medium pressure stage.
leisure accommodation vehicle (LAV)	Unit of living accommodation for temporary or seasonal occupation that may meet the requirement for the Road Vehicles (Construction and Use) Regulations, e.g., a caravan.
low pressure stage (LPG)	That part of the LPG installation between the outlet of the 2nd stage regulator and the gas appliance(s). For Propane, the nominal operating pressure is 37 mbar. For Butane, the nominal operating pressure is 28 mbar.
low pressure (NG only)	Gas inlet pressure to the meter regulator not exceeding 75 mbar.
high pressure stage (LPG)	That part of the LPG installation between the take-off valve of the bulk storage vessel or cylinder and the inlet of the 1st stage regulator. For Propane, the pressure will be in the region of 6.9 bar. For Butane, the pressure will be in the region of 1.93 bar. These pressures may vary dependent upon ambient temperatures.
medium pressure (NG only)	Gas inlet pressure to the meter regulator exceeding 75 mbar, but not exceeding 2 bar.
meter box	A receptacle or compartment designed and constructed to contain a gas meter with its associated fittings.
meter inlet valve (MIV)	A valve fitted upstream of and adjacent to a gas meter to shut off the supply of gas.
meter regulator	A device located in close proximity and upstream of a primary meter which is used solely to control the pressure of the gas within the gas installation.
must	The term "must" identifies a requirement by law in Great Britain at the time of publication.
OPSO	Over-pressure shut-off device.
residential park home (RPH)	A caravan designed for permanent residential accommodation that conforms to BS 3632 but does not meet all of the requirements for construction and use of the Road Vehicles (Construction and Use) Regulations.

responsible person	In relation to any premises, means the occupier of the premises, or any person with authority for the time being, to take appropriate action in relation to any gas fitting therein. In situations where there is also a duty holder e.g., rented premises, the Landlord and their representative (managing agent) also attract "Responsible Person" status and will also need to be informed of any unsafe situation identified and the risk classification applied.
service pipe (NG)	A pipe for distributing gas to a premises from a distribution main, being any pipe between a distribution main and the outlet of the first emergency control valve from the distribution main.
service pipework (LPG)	A pipe for supplying gas to premises from a gas storage vessel, being any pipe between the gas storage vessel and the outlet of the ECV.
shall	The term "shall" prescribes a procedure which, it is intended, will be complied with in full and without deviation.
should	The term "should" prescribes a procedure which, it is intended, will be complied with unless, after prior consideration, deviation is considered to be acceptable.
TTB (spillage monitoring device)	(Dutch Acronym "Themische Terugslag Beveiliging"). A temperature activated switching device, which links to a thermocouple interrupter device and shuts off the gas supply to an appliance burner before there is a build-up of a dangerous quantity of combustion products in the room concerned.
turn off	<p>➤ Prevent operation of appliance or installation.</p> <p>TURN OFF in the following order:</p> <ol style="list-style-type: none"> 1. Turn off gas isolation valve – only where this is not possible move to option 2; 2. Remove electrical fuse (turning down of room thermostats or turning clock to off is not acceptable) – only where this is not possible move to option 3; 3. Turn off appliance control and affix warning label to the appliance gas control. ◀
UPSO	Under-pressure shut-off device.
Work	<p>In relation to a gas fitting, this includes any of the following activities carried out by any person, whether an employee or not:</p> <ol style="list-style-type: none"> a) Installing or reconnecting the fitting b) Maintaining, servicing, disconnecting, permanently adjusting, repairing, altering or renewing the fitting or purging it of air or gas c) Where the fitting is not readily movable, changing its position and d) Removing the fitting. <p><i>Note: Work in this context does not include the connection or disconnection of a bayonet fitting or other self-sealing connector.</i></p>

A1.2 **ACRONYMS AND ABBREVIATIONS**

ACOP	approved code of practice
AECV	additional emergency control valve
AIV	additional inlet valve
ASD	atmosphere sensing device (ASD)
AR	At Risk
CAT	category
CO	carbon monoxide
CO₂	carbon dioxide
CoP	Code of Practice
DFE	decorative fuel effect
ECV	emergency control valve
ESP	emergency service provider
FSD	flame supervision device
GB	Great Britain
GS	gas supplier
GT	gas transporter
GECS	Gas Emergency Contact Centre
GIUSP	Gas Industry Unsafe Situations Procedure
GSR	Gas Safe Register
GSRER	Gas Safety Rights of Entry Regulations
GS(I&U)R	Gas Safety (Installation and Use) Regulations
ID	Immediately Dangerous
IGEM	Institution of Gas Engineers and Managers
HSWA	Health and Safety at Work Act
HSE	Health and Safety Executive
LAV	leisure accommodation vehicle
LIQUID GAS UK	Liquid Gas UK
LNIDL	Legislative, Normative and Informative Document List
LPG	Liquefied Petroleum Gas
MEM	meter equipment manager
MIV	meter inlet valve
NG	Natural Gas
OFTEC	Oil Firing Technical Association
OPSO	over-pressure shut-off
PE	polyethylene
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
RPH	residential park home
TB	Technical Bulletin (Gas Safe Register)
TTB	Themische Terugslag Beveiliging (see Definitions – Appendix 1)
UPSO	under pressure shut-off

A1.3

SYMBOLS AND UNITS

bar	bar
mbar	millibar
mm	millimetre
m³	cubic metre
m³/h	cubic metre per hour
kW	kilowatt
ppm	part per million
%	percentage.

APPENDIX 2: REFERENCES

GAS SAFE REGISTER – LEGISLATIVE, NORMATIVE AND INFORMATIVE DOCUMENT LIST

Legislative, Normative and Informative Document List (LNIDL), - The Gas Safe Register Normative Document List provides a current list of Normative Documents - this can be viewed online by visiting:

<https://www.gassaferegister.co.uk/sign-in/>.

GAS SAFE REGISTER TECHNICAL BULLETINS AND SAFETY ALERTS

Technical Bulletins and Safety Alerts – these can be viewed by registered engineers on-line by visiting: <https://engineers.gassaferegister.co.uk> - login and visit the Technical Information area.

A2.1 PRIMARY LEGISLATION

- Health and Safety at Work etc. Act 1974 as amended.

A2.2 SECONDARY LEGISLATION

- Gas Safety (Installation and Use) Regulations 1998 as amended
- Gas Safety (Management) Regulations 1996
- Gas Safety (Rights of Entry) Regulations 1996
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013.

A2.3 HSE ACOPS AND GUIDANCE

- L56 Safety in the installation and use of gas systems and appliances. ACoP and Guidance
- HSG48 Reducing error and influencing behaviour
- HSG65 Successful health and safety management
- INDG428 Inspecting and maintaining or replacing buried metallic pipework carrying LPG vapour.

A2.4 BSI STANDARDS

- BS 3632 Residential park homes
- BS 5871-4 Specification for the installation and maintenance of gas fires, convector heaters, fire/back boilers and decorative fuel effect gas appliances. Independent gas-fired flueless fires, convector heaters and heating stoves of nominal heat input not exceeding 6 kW
- BS 6400-2 Specification for installation, exchange, relocation, maintenance and removal of gas meters with a maximum capacity not exceeding 6 m³/h. Medium pressure
- BS 6400-3 Specification for installation, exchange, relocation and removal of gas meters with a maximum capacity not exceeding 6 m³/h. Low and medium pressure
- BS 6644 Specification for the installation and maintenance of gas-fired hot water boilers of rated inputs between 70 kW (net) and 1.8 MW (net)
- BS 6891 Specification for the installation and maintenance of low pressure gas installation pipework of up to 35 mm (R1¹⁴) on premises
- BS 7624 Installation and maintenance of domestic direct gas-fired tumble dryers of up to 6 kW heat input

- BS 7967 Guide for the use of electronic portable combustion gas analysers for the measurement of carbon monoxide in dwellings and the combustion performance of domestic gas-fired appliances
- BS EN ISO 10239 Small craft. Liquefied petroleum gas (LPG) systems

A2.5

IGEM STANDARDS AND GUIDANCE

- IGE/UP/1 Ed 2 Strength testing, tightness testing and direct purging of industrial and commercial gas installations
- IGE/UP/10 Ed 4 Installation of flued gas appliances in industrial and commercial premises
- IGE/UP/19 Ed 2 Design and application of interlock devices and associated systems used with gas appliance installations in commercial catering establishments
- ►IGEM/G/11 Supplement 1 Responding to domestic CO alarm activations/reports of fumes after attendance by the emergency service provider or the Liquefied Petroleum Gas supplier
- IGE/G/5 Ed 3 Gas installations in multi-occupancy buildings◀
- IGE/G/6 Gas supplies to mobile dwellings.

A2.6

LIQUID GAS UK STANDARDS AND GUIDANCE

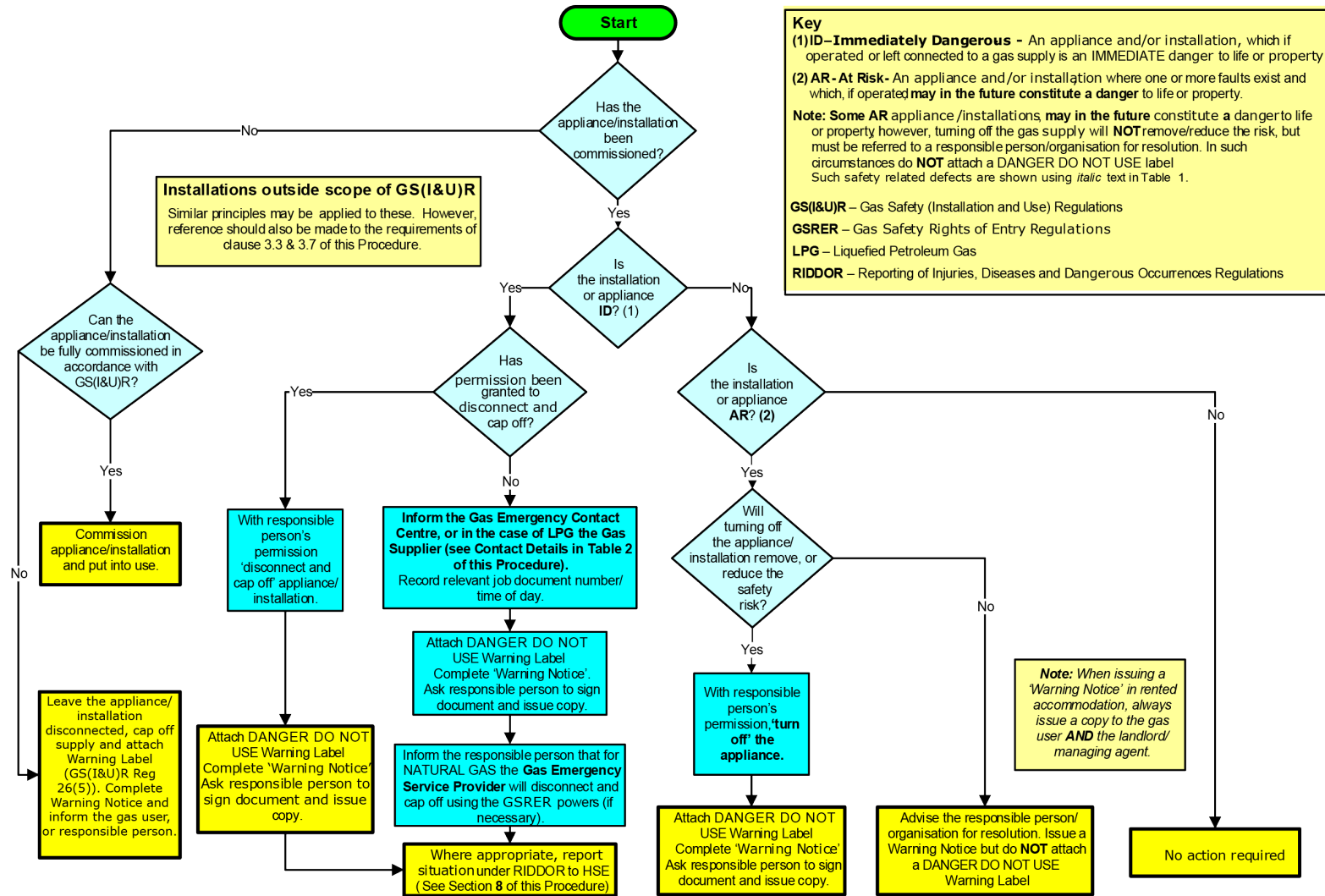
- CoP 1 Part 1 Bulk LPG Storage at Fixed Installations
- CoP 1 Part 2 Bulk LPG Storage at Fixed Installations
- CoP 1 Part 4 Bulk LPG Storage at Fixed Installations
- CoP 7 Storage of Full and Empty LPG Cylinders and Cartridges
- CGS 39 Regulators – Safe Use.

A2.7

►MISCELLANEOUS

- PD 54823 Guidance for the design, commissioning and maintenance of LPG systems in small craft. ◀

APPENDIX 3: APPLYING GIUSP



Key

(1) **ID – Immediately Dangerous** - An appliance and/or installation, which if operated or left connected to a gas supply is an IMMEDIATE danger to life or property

(2) **AR - At Risk** - An appliance and/or installation where one or more faults exist and which, if operated **may in the future constitute a danger** to life or property.

Note: Some AR appliance /installations, may in the future constitute a danger to life or property however, turning off the gas supply will **NOT** remove/reduce the risk, but must be referred to a responsible person/organisation for resolution. In such circumstances do **NOT** attach a DANGER DO NOT USE label
Such safety related defects are shown using *italic* text in Table 1.

GS(I&U)R – Gas Safety (Installation and Use) Regulations
GSRER – Gas Safety Rights of Entry Regulations
LPG – Liquefied Petroleum Gas
RIDDOR – Reporting of Injuries, Diseases and Dangerous Occurrences Regulations

Note: When issuing a 'Warning Notice' in rented accommodation, always issue a copy to the gas user AND the landlord/ managing agent.

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APPENDIX 4: GAS EMERGENCIES

Dealing with gas emergencies (Reports of gas escapes and fumes) – Gas engineer not on site of reported emergency.

Where a gas engineer is advised of gas escapes or fumes when not on site, they will give following instructions to the gas user/responsible person:

1. Turn off the gas
For Natural Gas – turn off the gas supply at the gas meter.
If the meter is located in a cellar or basement and there is a smell of gas in the cellar or basement, do not enter the cellar or basement but evacuate the building.

For Liquefied Petroleum Gas (LPG) –
Bulk storage supply – turn off the gas outside the building and the gas isolation valve on top of the above-ground storage vessel(s), or underground storage vessel(s).
LPG – metered installations – turn off at the meter installation.
LPG – cylinder fed installations – turn off all cylinder valves.
2. Extinguish all naked flames
Do not smoke or strike matches.
3. Do not operate electrical switches or equipment
Turning a light on or off can ignite escaping gas.
4. Open windows and doors
This ventilates the property. Additionally for LPG, ventilate at low level (LPG is heavier than air) e.g., open external doors.
5. Call the relevant Gas Emergency Number (see Table 2) with the following information:
 - Address/Location of the gas emergency
 - Name, address and telephone number of person reporting the emergency.

Region	Gas Type		Contact Details	Telephone Details
England, Scotland and Wales	Natural Gas		Contact the Gas Emergency Contact Centre	0800 111 999
	LPG*	Bulk and metered supplies		See telephone number on the bulk storage vessel or at the meter
		Cylinder supplies	For cylinder supplies on caravan parks and hire boats, the site owner and/or boat operator may also have responsibilities. Advice may be obtained from the gas company identified on the cylinder through their emergency contact details.	See gas supplier emergency contact details in the local telephone directory
Northern Ireland	Natural Gas		Northern Ireland Gas Emergency Service	0800 002 001
	LPG*	Bulk and Metered supplies		See telephone number on the bulk storage vessel or at the meter
		Cylinder supplies	For cylinder supplies on caravan parks and hire boats, the site owner and/or boat operator may also have responsibilities. Advice may be obtained from the gas company identified on the cylinder through their emergency contact details.	See gas supplier emergency contact details in the local telephone directory
Isle of Man	Natural gas and LPG*		Manx Gas Ltd	0808 1624 444
Channel Islands - Guernsey	Mains gas‡ and LPG*		Contact Guernsey Gas Ltd	01481 749000
Channel Islands - Jersey	Mains gas‡ and LPG*		Contact Jersey Gas Company Ltd	01534 755555
‡ Mains gas in the Channel Islands is an LPG and air mixture			* LPG – Liquefied Petroleum Gas	
Gas Emergency contact details of the main suppliers of LPG in the British Isles are shown below				
Air Products:	0800 389 0202	BDS Fuels:	015242 76575	
AvantiGas:	0808 1782009	Camgas:	01244 530 391	
Calor Great Britain:	03457 444 999	Flogas: Great Britain	03457 200 100	
Calor Northern Ireland:	08450 755588	Flogas: Northern Ireland	028 9073 2611	
J Gas:	0345 4503121	Vista Gas (now Calor Gas)	03457 444 999	
Shaw Gas:	01765 602621			
Gleaners:	01343 543535			

TABLE 2 - CONTACT DETAILS OF GAS EMERGENCY SERVICE PROVIDERS (ESPs) AND GAS SUPPLIERS (GSS) IN THE BRITISH ISLES

APPENDIX 5: VISUAL RISK ASSESSMENT OF GAS APPLIANCES

INTRODUCTION

When working on a gas installation there are occasions when gas engineers need to visually inspect any gas appliances encountered. This Appendix gives guidance as to when visual checks are required. Gas engineers carrying out a visual risk assessment of a gas appliance(s) have a minimum responsibility to ensure that the appliance(s) does not constitute a danger.

➤➤ Generally, a visual risk assessment is for visually apparent defects only and does not require moving an appliance or any building infrastructure unless the engineer has concerns. The expression “safe to use” is not to be applied to a visual only assessment as this expression implies a full 26(9) examination has been performed. ◀◀

For further investigation purposes, an engineer will need to hold the relevant competencies.

➤ *Note: Where gas work has been carried out on a particular appliance(s), the checks required by Regulation 26(9) of GS(I&U)R are required also to be completed. ◀*

VISUAL RISK ASSESSMENT

Table 3 shows the recommended minimum checks to enable compliance with HSWA and GS(I&U)R that will need to be considered when carrying out a visual risk assessment of an existing gas appliance(s), where no other gas work on that particular appliance(s) has been undertaken, based on three scenarios:

- an appliance is encountered whilst working on another appliance (e.g., whilst servicing a central heating boiler, a gas cooker is installed in the same room. A visual assessment of the gas cooker would be necessary)
- an appliance forming part of a tightness test (e.g., on completion of a satisfactory tightness test where no air has been admitted into the system)
- an appliance, when purging the system of air and relighting, following work elsewhere on the installation (e.g., after undertaking work on the system that has allowed air to enter the system).

Checks required	An appliance is encountered whilst working on another appliance	An appliance forming part of a tightness test	An appliance, when purging the system of air and relighting, following work elsewhere on the installation
Location	✓	✓	✓
Flueing	✓	✓	✓
Ventilation	✓	✓	✓
Signs of distress	✓	✓	✓
Stable/secure	✓	✓	✓
Flame picture		*	✓
✓ = Required * = Considered best practice			

TABLE 3 – MINIMUM VISUAL CHECKS TO ENSURE COMPLIANCE

DETAILS OF SPECIFIC CHECKS

- Location** Is the gas appliance installed in a suitable room and/or space with regard to the requirements of GS(I&U)R, for example, an open-flued appliance installed in a bathroom or shower room, or a flueless appliance installed in an undersized room?
- Flueing** If the gas appliance is flued (either open-flued or room-sealed), is there evidence that the gas appliance has provision for adequate methods for the removal of the products of combustion to atmosphere?
- Ventilation** Where appropriate, is there provision for the supply of adequate ventilation for the appliance to operate safely (e.g., is there evidence of purpose-provided ventilation for an open-flued/flueless appliance)?
- Signs of distress** Are there any signs of distress on the gas appliance/the surrounding area (e.g., check for signs of discolouration and heat damage. etc)?
- Stable/secure** Is it visually apparent that the appliance installation is both stable and secure?
- Flame picture** Where the flame picture can be viewed is it correct for the appliance type?

Note 1: Live fuel effect gas fires and decorative fuel effect gas appliances are designed to produce a luminous flame.

Note 2: Industry best practice is to light all burners (e.g., cookers.)

Results of the Visual Risk Assessment

There is no specific requirement to record the results of a visual risk assessment but engineers are advised to positively record that a visual risk assessment has been undertaken. However, where, as a result of the assessment an unsafe situation has been identified or is suspected, the current GIUSP shall be implemented and the appropriate actions taken and relevant warning notices and labels completed and issued.

APPENDIX 6: MINIMUM WARNING NOTICE REQUIREMENTS

This Appendix details the minimum requirements of a suitable warning notice that is required to be left with the gas user/responsible person following identification of either an Immediately Dangerous, or At Risk situation.

1. Details of the gas user name and address
2. Details of Landlord/responsible person's name and address (where appropriate)
3. Date of issue of warning notice
4. Details and location of any appliance(s)/installation and what is unsafe
5. The Unsafe Category applied i.e., ID or AR
6. Details of all actions taken (including any third parties requiring to be notified)
7. Details of what is required to be done to rectify the situation
8. Details of any RIDDOR situations identified and reported
9. The name and identifier of the engineer
10. The name, registration number and contact details of the company issuing the warning notice
11. Contact Details of the Gas Emergency Services
12. Contact Details of Gas Safe Register
13. Definition of Unsafe Categories
14. Provision to capture the Gas user's signature.

APPENDIX 7: RIDDOR/GAS SAFE REGISTER REPORTING FLOWCHART

Note: Photographic evidence may assist in any subsequent investigation of an unsafe situation.

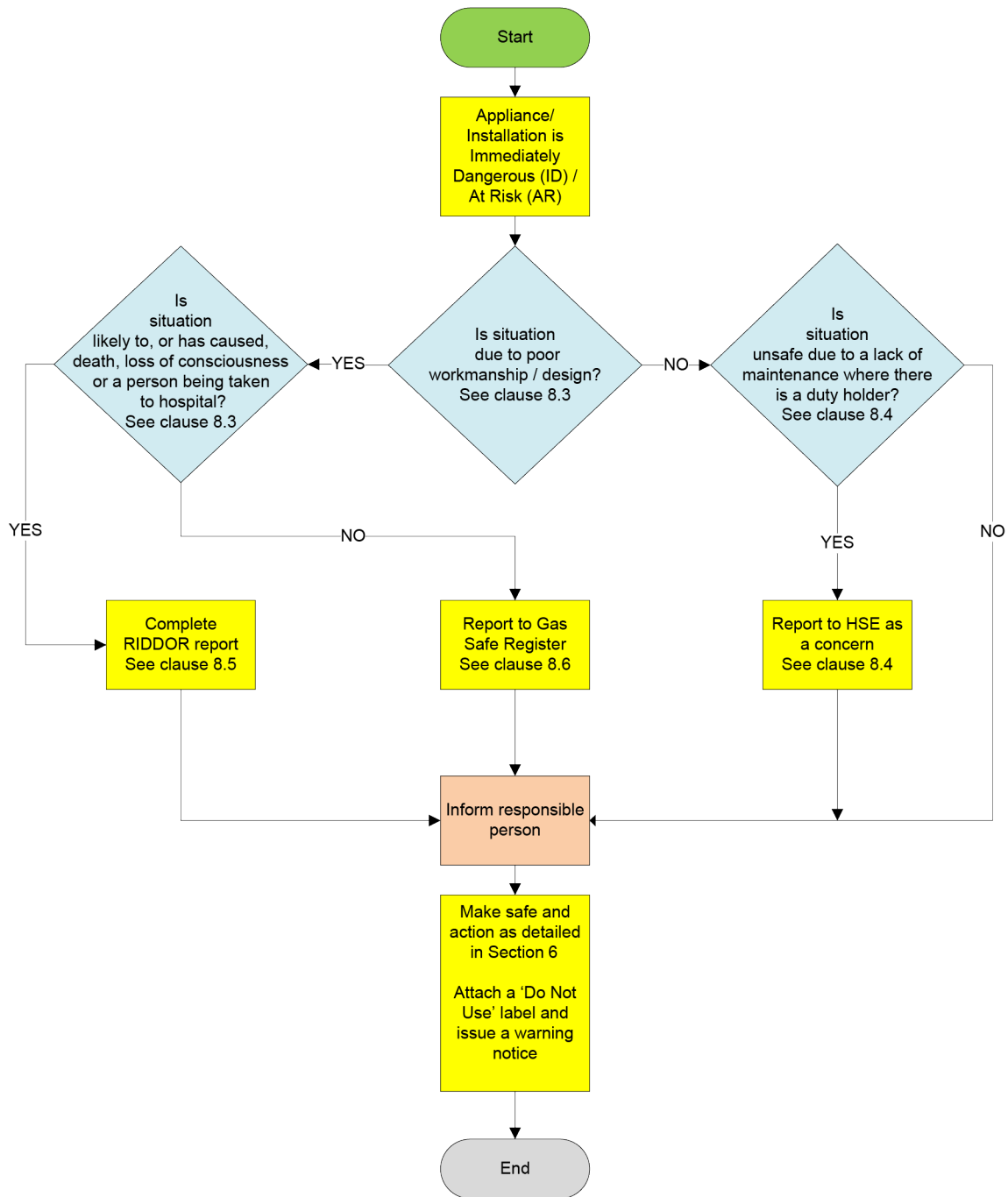


FIGURE 3 - REPORTING UNSAFE WORKFLOW DIAGRAM

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Communication 1887
Price Code: CY

Institution of Gas Engineers & Managers (IGEM)

IGEM House, 26 & 28 High Street
Kegworth, Derbyshire DE74 2DA

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e: technical@igem.org.uk
www.igem.org.uk

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