

***IGEM/GL/4 Edition 2
Communication 1743***

Gas system assets - risk management



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Communication 1743**

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SECTION 1 : INTRODUCTION

1.1 This Standard supersedes IGE/GL/4 Edition 1, Communication 1629, which is obsolete.

1.2 This Standard specifies requirements for risk management of assets associated with gas systems. In GB, this would mean systems that come within the scope of one or more of:

- Construction (Design and Management) Regulations (CDM)
- Gas Safety (Installation and Use) Regulations (GS(I&U)R)
- Gas Safety (Management) Regulations (GS(M)R)
- Management of Health and Safety at Work Regulations (MHSWR)
- Pipelines Safety Regulations (PSR)
- Pressure Systems Safety Regulations (PSSR).

It supplements guidance given in HSL21, HSL56, HSL80, HSL81, HSL82, HSL122, HSL144, HSG65 and HSG250.

1.3 This Standard is published by the Institution of Gas Engineers and Managers (IGEM). It has been drafted by an IGEM Panel appointed by IGEM's Gas Transmission and Distribution Committee, and has been approved by IGEM's Technical Co-ordinating Committee on behalf of the Council.

1.4 Many of the features of effective health and safety management are indistinguishable from the sound management practices advocated by proponents of quality and business excellence. Indeed, commercially successful companies often also excel at health and safety management, precisely because they bring efficient business expertise to bear on health and safety as on all other aspects of their operations.

1.5 The principles of sound health and safety management should be fully taken into account to ensure that the system can be constructed, maintained and operated safely and effectively. Guidance on these principles is set out in HSG65.

1.6 The Standard makes use of the terms "should", "shall" and "must". Notwithstanding Sub-Section 1.9:

- the term "should" prescribes a requirement which, it is intended, will be complied with unless, after prior consideration, deviation is considered to be acceptable
- the term "shall" prescribes a procedure which, it is intended, will be complied with in full and without deviation
- the term "must" identifies a requirement by law in GB at the time of publication.

Such terms may have different meanings when used in legislation, or Health and Safety Executive (HSE) Approved Codes of Practice (ACoPs) or guidance, and reference needs to be made to such statutory legislation or official guidance for information on legal obligations.

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 in the sense that actions by people initiated or contributed to the accidents, or people might have acted in a more appropriate manner to avert them.

It is therefore necessary to give proper consideration to the management of these human factors and the control of risk. To assist in this, it is recommended that due regard be paid to HSG48.

- 1.8 The primary responsibility for compliance with legal duties rests with the employer. The fact that certain employees, for example “responsible engineers”, are allowed to exercise their professional judgement does not allow employers to abrogate their primary responsibilities. Employers must:
- have done everything to ensure, so far as it is reasonably practicable, that there are no better protective measures that can be taken other than relying on the exercise of “professional judgement” by “responsible engineers”
 - have done everything to ensure, so far as it is reasonably practicable, that “responsible engineers” have the skills, training, experience and personal qualities necessary for the proper exercise of professional judgement
 - have systems and procedures in place to ensure that the exercise of professional judgement by “responsible engineers” is subject to appropriate monitoring and review
 - not require “responsible engineers” to undertake tasks which would necessitate the exercise of professional judgement that is not within their competence.
- Note: There should be written procedures defining the extent to which “responsible engineers” can exercise their professional judgement. When “responsible engineers” are asked to undertake tasks which deviate from this, they should refer the matter for higher review.*
- 1.9 Notwithstanding Sub-Section 1.6, this Standard does not attempt to make the use of any method or specification obligatory against the judgement of the “responsible engineer”. New and improved practices may be adopted prior to this Standard being updated. Amendments to this Standard will be issued when necessary and their publication will be announced in the Journal of Igem.
- 1.10 Requests for interpretation of this Standard in relation to matters within its scope, but not precisely covered by the current text, should be addressed to Technical Services, Igem House, High Street, Kegworth, Derbyshire, DE74 2DA. Such requests will be submitted to the relevant Committee. Any advice given by or on behalf of Igem does not imply acceptance of any liability, nor does it relieve any party of their statutory obligations.
- 1.11 This Standard was published in January 2010.

SECTION 2 : SCOPE

- 2.1 This Standard specifies a framework for risk management of assets associated with gas systems.
- 2.2 The specified framework covers all activities, including design, installation, operation, maintenance, management and providing an emergency service on the assets associated with gas systems.
- 2.3 The specified framework is based on the framework identified in HSG65, but with further requirements to make it gas industry-specific.
- 2.4 This Standard applies to all fuel gases, including but not limited to Natural Gas (NG), Liquefied Petroleum Gas (LPG), Biogas and Towns Gas.
- 2.5 Italicised text is informative and does not represent formal requirements.
- 2.6 Appendices are informative and do not represent formal requirements unless specifically referenced in the main sections via the prescriptive terms "should", "shall", or "must".

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SECTION 3 : LEGAL AND ALLIED CONSIDERATIONS

3.1 GENERAL

- 3.1.1 This Standard is set out against a background of legislation in force in Great Britain (GB) at the time of publication. Similar considerations are likely to apply in other countries where reference to appropriate national legislation is necessary. The principal items of legislation are outlined in Section 3.2.

All relevant legislation must be applied and relevant ACoPs, official Guidance and referenced codes, Standards, etc. shall be taken into account.

Note: Appendix 2 is relevant in this respect.

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

Health, safety and environmental legislation must be observed, especially those requirements which are concerned with the duties of employers, not only to their own employees, but also to members of the public who may be affected.

- 3.1.2 Unless otherwise stated, the current editions of legislation and Standards apply.
- 3.1.3 In the absence of specific legislation, it is essential that installations are designed, constructed, installed, operated and maintained so as to be safe.
- 3.1.4 The legislation appropriate to any particular installation will depend largely upon its location. Advice will need to be sought from the relevant Authorities.

3.2 LEGISLATION

3.2.1 Control of Pollution Act

This Act makes provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health.

3.2.2 Environmental Protection Act

This Act makes provision for the improved control of pollution arising from certain industrial processes, the collection and disposal of waste. It makes further provision in relation to such waste, and provides for the extension of the Clean Air Acts to prescribed gases.

An organisation's management system must be underpinned by a company policy on the environment.

Note: Further guidance can be found on the Environment Agency, Scottish Environment Protection Agency or Northern Ireland Environment Agency websites as appropriate.

3.2.3 Health and Safety at Work etc. Act (HSWA)

HSWA applies to all persons involved with work activities, including employers, the self-employed, employees, designers, manufacturers, suppliers, etc. as well as the owners of premises. It places general duties on such people to ensure, so far as is reasonably practicable, the health, safety and welfare of employees and the health and safety of members of the public who may be affected by the work activity.

An organisation's overall health, safety system must be underpinned by a company policy on health and safety.

3.2.4 **Confined Spaces Regulations**

These Regulations apply to a whole range of confined spaces. The supplier or designers of an enclosure and equipment within it is required to perform a risk assessment of the enclosure with respect to safe access and egress and to give clear instructions to operators on access/egress as well as to what actions to take in the event of a gas alarm occurring. Employers and the self employed should prevent entry into confined spaces unless avoidance is not reasonably practicable and unless there is a system of work which renders the work safe. They are also required to have specific emergency arrangements in place.

3.2.5 **Construction (Design and Management) Regulations (CDM)**

CDM place duties on clients, designers and contractors to ensure that health and safety is taken into account and managed effectively throughout all stages of a construction project.

Note: HSL144 provides an ACoP and guidance on CDM.

3.2.6 **Control of Substances Hazardous to Health Regulations (COSHH)**

COSHH require employers to assess the health risks associated with the use of and exposure to substances which are hazardous to health. Primarily, COSHH relate to health and safety at work but chemical data gathered for COSHH may also be useful when assessing environmental effects.

COSHH require:

- a written risk assessment prior to using substances which may be hazardous to health
- consideration to the properties, health effects and form of these substances. Various amendments have required specific attention be given to carcinogens, asthmogens and biological agents.

The 2004 amendments implement a new framework for occupational exposure limits and bring together eight principles of good practice.

3.2.7 **Dangerous Substances and Explosive Atmospheres Regulations (DSEAR)**

DSEAR are concerned with protection against risks from fire, explosion and similar events arising from dangerous substances used or present in the workplace. DSEAR require that risks from dangerous substances are assessed, eliminated or reduced. DSEAR contain specific requirements to be applied where an explosive atmosphere may be present and require the provision of arrangements to deal with accidents, emergencies etc., provision of information, training and use of dangerous substances. DSEAR also require the identification of pipelines and containers containing hazardous substances.

DSEAR require an employer to classify gas installations into hazardous and non hazardous areas.

In particular:

- Where a dangerous substance is or is liable to be present at the workplace, the employer shall make a suitable and sufficient assessment of the risks to his employees which arise from that substance
- where an explosive atmosphere may occur at the workplace sufficient information to show:
 - (i) those places which have been classified into zones (Regulation 7)

- (ii) equipment which is required for, or helps to ensure, the safe operation of equipment located in places classified as hazardous
- (iii) that any verification of overall explosion safety required has been carried out
- (iv) the aim of any co-ordination required (Regulation 11) and the measures and procedures for implementing it.

3.2.8 **Electricity at Work Regulations**

These Regulations apply to a wide range of electrical work, from overhead power lines to the use of office computers and batteries and include work on gas equipment using electrical energy.

The Regulations are concerned with the prevention of danger from electric shock, electric burn, electrical explosion or arcing or from fire or explosion initiated by electrical energy.

The Regulations impose duties on every employer, employee and self-employed person and require that persons engaged in electrical work be competent or be supervised by a competent person.

Note: HSR25 provides guidance on the Regulations.

3.2.9 **Environmental Permitting Regulations (EPR)**

These Regulations replace the system of waste management licensing in Part II of the Environmental Protection Act and the Waste Management Licensing Regulations, and the system of permitting in the Pollution Prevention and Control (England and Wales) Regulations, with a new system of environmental permitting in England and Wales.

The Regulations provide a single, streamlined, risk-based framework for permitting and compliance. They introduce the possibility of a single permit and regulator for some sites, and standard permits, which are easier to obtain.

In Scotland, the Waste Management Licensing Regulations and Pollution Prevention and Control (Scotland) Regulations apply.

3.2.10 **Gas Safety (Installation and Use) Regulations (GS(I&U)R)**

GS(I&U)R are relevant statutory provisions of HSWA setting out general and detailed requirements dealing with the safe installation, maintenance and use of gas systems, including gas fittings, appliances and flues.

Note: GS(I&U)R do not apply to certain premises (see HSL56 Guidance Notes 28 and 29). However, where they do not apply, the principles of GS(I&U)R need to be applied, notwithstanding that the requirement for Gas Safe Registration/CORGI need not be applied.

GS(I&U)R place responsibilities on those installing, servicing, maintaining or repairing gas appliances, pipework etc. as well as suppliers and users of gas.

GS(I&U)R define the gas supplier for both NG and LPG. HSL56 provides guidance on those definitions, in particular for the more complicated case of LPG supplied from storage vessels and from cylinders.

GS(I&U)R define the type of work that requires persons carrying out such work, or their employers, to be an "approved class of person". In Great Britain and the Isle of Man, this means registration under the Gas Safe Register scheme. Other schemes apply, at the time of writing, in Northern Ireland, Guernsey and Jersey and persons working in these places need to be aware of the appropriate registration scheme in place at the time of work.

The gas operative must check the safety of any appliance or pipework they install or work on and take appropriate action where they find faults. Where the premises are let or hired out, the landlord or hirer has special responsibilities to ensure that any operative they use for the gas fitting, service or maintenance or safety is a member of an approved class of persons and is competent to carry out such work. If any serious fault is found, the operative must inform both the landlord/hirer, as well as the user, so that such faults can be rectified before further use. Reference shall be made to the requirements contained in the Gas Industry Unsafe Situations Procedures.

GS(I&U)R place responsibilities on LPG suppliers to deal with escapes of LPG. For NG, GS(M)R apply (See Sub-section 3.2.11).

Note: Advice on dealing with gas escapes is contained in IGE/SR/20.

3.2.11 **Gas Safety (Management) Regulations (GS(M)R)**

GS(M)R place obligations on gas conveyors to have an approved Safety Case, which will include to:

- have an emergency service provider (ESP)
- convey gas that is within specification
- report incidents.

Note: HSL80 provides a guide to GS(M)R.

GS(M)R place specific duties on gas conveyors or their ESPs, for dealing with gas escapes from pipes on their networks. Their primary duty is to make the situation safe. They are responsible not only for dealing with escapes from their own pipes, but also for dealing with escapes from gas fittings supplied with gas from pipes on their network. In GS(M)R, the term "gas escapes" includes escapes or emissions of carbon monoxide (CO) from gas fittings.

The ESP has specific duties to:

- provide a continuously staffed and free telephone service to enable persons to report gas escapes and
- pass such reports on to the person who has the responsibility for dealing with the escape.

In addition, there are duties imposed on gas suppliers and gas conveyors to notify the ESP should they, rather than the ESP, receive a report of an escape from the consumer.

GS(M)R require gas conveyors to investigate fire and explosion incidents upstream of the emergency control valve (ECV) and to send a report of the investigation to HSE. Gas conveyors are also required to investigate fire and explosion incidents downstream of the ECV, but this is limited to establishing whether the seat of the fire or explosion was in an appliance and, if so, which one, or in the meter installation or installation pipework.

Responsibility for investigating RIDDOR reportable incidents as a result of an escape of CO from incomplete combustion of gas from a gas fitting, is placed on gas suppliers. HSE must be notified before such investigations commence.

Note 1: Advice on dealing with gas escapes is contained in IGE/SR/20.

Note 2: Advice on investigating gas escapes and incidents is contained in IGE/GL/8.

3.2.12 **Management of Health and Safety at Work Regulations (MHSWR)**

MHSWR impose a duty on employers and the self-employed to make assessments of risks to the health and safety of employees, and non-employees affected by their work. They also require effective planning and review of protective measures.

3.2.13 **Pipelines Safety Regulations (PSR)**

PSR provide a means of securing pipeline integrity by ensuring that a pipeline is designed, constructed and operated safely. PSR apply to all Network pipes operated by a gas conveyor. Installations can vary in size and complexity, and installation designers need to give due consideration to the operating pressure (OP) and required gas flows.

Note: HSL81 provides an ACoP and guidance and HSL82 provides guidance on PSR.

In particular, PSR require that the operator ensures no fluid is conveyed in a pipeline unless the pipeline has been designed so that, as far as is reasonably practicable, examination and maintenance may be carried out safely. PSR also require that the operator ensures that a pipeline is maintained in an efficient state, in efficient order and in good repair.

3.2.14 **Pressure Systems Safety Regulations (PSSR)**

PSSR impose duties on designers, importers, suppliers, installers and user or owners to ensure that pressure systems do not give rise to danger. This is done by the correct design, installation and maintenance, provision of information, operation within safe operating limits and, where applicable, examination in accordance with a written scheme of examination drawn up or approved by a competent person (as defined by PSSR).

Relevant fluids for the purpose of this document would be gas at a pressure of 0.5 barg and above. A pressure system would include bulk storage tanks, pressure vessels, pipelines and protective devices. Once the pressure in the pipework drops below 0.5 barg, and the user/owner can show clear evidence that the system does not contain, and is not liable to contain, a relevant fluid under foreseeable operating conditions, then that part of the system is no longer covered by PSSR. This is likely to be the case after the pressure relief valve associated with a pressure reducing valve which takes the pressure to below 0.5 barg, for example at the entry to a building.

Note the special requirements placed on protective devices in such systems. PSSR also apply to pipelines and their protective devices in which the pressure exceeds 2 barg.

Note: More information is available in HSL122 and some information is presented in the HSE free leaflets INDG261 and INDG178.

3.2.15 **Provision and Use of Work Equipment Regulations (PUWER)**

Work equipment has a wide meaning and includes tools such as hammers, laboratory apparatus, for example Bunsen burners, ladders, photocopiers, lifting equipment and machinery for use at work.

PUWER place duties on employers in relation to selection, suitability, maintenance, inspection, installation, instruction, training, prevention of danger and control of equipment.

Note: More information on PUWER can be found in HSL22. Free leaflets include INDG291 and INDG229.