

***IGEM/GM/8 Part 4 Edition 2
Communication 1798***

Non-domestic meter installations

Part 4 : Operation and Maintenance

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Communication 1798***

Non-domestic meter installations

Part 4 : Operation and Maintenance



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SECTION 1 : INTRODUCTION

- 1.1 This Standard supersedes IGE/GM/8 Part 4, Communication 1709, which is obsolete.
- 1.2 This Standard has been drafted by an Institution of Gas Engineers and Managers (IGEM) Panel, appointed by IGEM's Gas Measurement Committee, subsequently approved by that Committee and has been approved by IGEM's Technical Co-ordinating Committee on behalf of the Council of IGEM.
- 1.3 IGE/GM/8 is published in 5 parts:
- Part 1 covering design
 - Part 2 covering locations, housings and compounds
 - Part 3 covering installation and commissioning
 - Part 4 covering operation and maintenance
 - Part 5 covering notices and labels.
- 1.4 This Standard covers the operation and maintenance of gas supply meter installations (see Sub-Section 2.1) of capacity exceeding $6 \text{ m}^3 \text{ h}^{-1}$ and maximum operating pressure (upstream) (MOP_u) not exceeding 38 bar.

With the exception of the few installations of MOP_u exceeding 38 bar, the majority of industrial and commercial meter installations can be operated and maintained by following IGE/GM/6 (for MOP_u not exceeding 100 mbar only) and/or IGE/GM/8.

Note: IGE Standards use pressure breaks as adopted in European standards. However, in the UK, the actual limit of pressure for IGE/GM/6 designs is 75 mbar. In practice, it is rare for a meter installation to have MOP_u lying between 75 mbar and 100 mbar in the UK.

It is the intention that IGE/GM/6 be used for the largest proportion of installations that can be covered by "standard designs" for MOP_u not exceeding 100 mbar.

For $100 \text{ mbar} < \text{MOP}_u \leq 38 \text{ bar}$ or where an installation is not a "standard design" as specified in IGE/GM/6, IGE/GM/8 applies (see also Note 4 to clause 2.1).

For a turbine meter installation of MOP_u not exceeding 100 mbar, there are no recognised standard designs i.e. IGE/GM/6 does not apply. It is recommended that IGE/GM/8 be used for all such installations.

For any meter installation of MOP_u exceeding 38 bar, IGE/GM/4 applies.

- 1.5 This Standard applies to onshore gas supply installations only. It is retrospective, in that the MAM is to operate and maintain existing equipment in accordance with this Standard wherever practical to do so.

For installations designed to previous standards that do not meet all the requirements of this document e.g. the performance tolerances (see Table 3) the pass/fail criteria used will need to reflect the original design requirements for the installation.

- 1.6 Over recent years ownership and responsibility for new installations covered by this Standard has been liberalised from gas transporters (GTs) to Meter Asset Managers (MAMs) and consumers. The Regulation Authority; the Office of Gas Supply (OFGAS), and later the Office of Gas and Electricity Markets (Ofgem), have required that MAMs and installers are separately accredited for the work they carry out. Approved MAMs have operational and management

responsibility, while Approved Meter Installers (currently OAMI) carry out meter work, installation, modification, repair, maintenance and removal activities. Both work to the relevant Ofgem Codes of Practice:

- Meter Asset Managers Code of Practice (MAMCoP)
- Codes of Practice for Meter Installations (CoP/1a, b and c).

At the same time, new licence conditions have made gas suppliers responsible for co-ordinating the provision of metering services and have placed responsibilities on GTs to underpin the overall safety of the gas supply system from the distribution main to the outlet of the meter installation.

Note: Under these arrangements, an Supply Point Administration Agreement (SPAA) approved MAM does not have to be an OAMI, but has an obligation to use an OAMI to carry out work on a meter installation.

Notwithstanding Sub-Section 1.11, total compliance with IGEN/GM/8 is necessary for installations and modules where the meter installation has to comply with the MAMCoP.

1.7 This Standard does not detail the management processes required for compliance with the Pressure Systems Safety Regulations (PSSR), such guidance is provided by IGEN/GL/5. It is intended that work carried out in accordance with this Standard and IGEN/GL/5 will conform to the requirements of PSSR.

1.8 Terms such as "maximum operating pressure" (MOP), "maximum incidental pressure" (MIP) and "operating pressure" (OP) are used to reflect gas pressure terminology used in European standards. These terms will arise in all relevant IGEN Standards and, possibly, in other standards. Other terms have been introduced to assist in recognition of design information to be transferred between interested parties.

Note: Appendix 10 of IGEN/GM/8 Part 1 shows an explanation of the terms used by setting out the definitions of the terms, explaining the suffixes, the relationship between the terms, and their significance.

1.9 This Standard makes use of the terms "must", "shall" and "should" when prescribing particular procedures. Notwithstanding Sub-Section 1.10:

- the term "must" identifies a requirement by law in Great Britain (GB) at the time of publication
- the term "shall" prescribes a procedure which, it is intended, will be complied with in full and without deviation
- the term "should" prescribes a procedure 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) Approved Code of Practice (ACoPs) or guidance, and reference needs to be made to such statutory Legislation or official guidance for information on legal obligations.

1.10 Notwithstanding Sub-Section 1.9, this Standard does not attempt to make the use of any method or specification obligatory against the judgement of the responsible engineer. Where new and better techniques are developed and approved, they are to be adopted without waiting for modification to this Standard. Amendments to this Standard will be issued when necessary, and their publication will be announced in the Journal of the Institution and elsewhere, as appropriate.

- 1.11 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 "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. 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.
- 1.12 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.
- 1.13 Requests for interpretation of this Standard in relation to matters within their scope, but not precisely covered by the current text, should be addressed in writing to Technical Services, The Institution of Gas Engineers and Managers, IGEM House, High Street, Kegworth, Derbyshire, DE74 2DA, or emailed to technical@igem.org.uk and will be submitted to the relevant Committee 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 IGEM, this does not relieve the responsible engineer of any of his or her obligations.
- 1.14 This Standard was published in October 2016.

SECTION 2 : SCOPE

- 2.1 This Standard applies to all onshore, gas supply meter installations (hereafter referred to as "installations") (and defined in IGE/G/1) of flow rate (capacity) exceeding $6 \text{ m}^3 \text{ h}^{-1}$ and MOP_u not exceeding 38 bar and complying with IGE/GM/8 Part 1 (see also Note 7 below).

Installations with the following types of meter are covered:

- diaphragm
- rotary displacement (RD)
- turbine
- ultrasonic.

Note 1: For installations of capacity not exceeding $6 \text{ m}^3 \text{ h}^{-1}$, intended to carry Natural Gas (NG), BS 6400-1 or BS 6400-2 apply, as appropriate for MOP_u . For non-domestic premises there are additional legal requirements that may have to be met, e.g. Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).

The requirements of this document may be applied to installations of capacity not exceeding $6 \text{ m}^3 \text{ h}^{-1}$ and MOP_u exceeding 2 bar.

Note 2: For installations of MOP_u exceeding 38 bar, IGE/GM/4 applies and IGE/TD/13 may be used for the regulation of pressure. However, where the metering pressure is not exceeding 38 bar, this Standard applies. Where IGE/TD/13 is used, the control and fault pressure ranges have to be acceptable to the consumer and it may be necessary to apply tolerances required by IGE/GM/8 to IGE/TD/13 control philosophy.

Note 3: Primarily, IGE/GM/8 has been produced for primary meters and other meters used for billing purposes. However, the principles may be applied for other meters, for example appliance check meters or departmental charging meters, when certain procedures may not apply.

Note 4: IGE/GM/6 provides procedures for "standard" installations of MOP_u not exceeding 100 mbar. For other, "non-standard", installations of MOP_u not exceeding 100 mbar, IGE/GM/8 applies. See also the note within Sub-Section 1.4.

Note 5: For turbine meters and ultrasonic meters (USMs), in addition to IGE/GM/8, some of the principles of IGE/GM/4 may apply and further useful information is also included.

Note 6: IGE/GM/8 does not address the Network pipeline (see IGE/TD/1, IGE/TD/3, IGE/TD/4 and IGE/G/5, as appropriate). IGE/GM/8 does not address requirements for a pressure regulating installation (PRI) installed in a Network pipeline that is not part of the meter installation, when IGE/TD/13 applies.

Note 7: It is appropriate to apply this Standard for existing installations complying with IGE/G/1.

- 2.2 This Standard covers installations that are wholly downstream of the outlet of the emergency control valve (ECV) as recommended in IGE/G/1, in which case the installation is not part of the Network. The owner or user of the installation would not, therefore, be a conveyor of gas on the Network and would not be subject to the general duties of the Gas Safety (Management) Regulations (GS(M)R). Similarly, the owner or user of the installation would not be an operator of a pipeline and, therefore, would not be subject to the requirement of the Pipelines Safety Regulations (PSR). However, the installation may be subject to the requirements of PSSR.

- 2.3 This Standard applies to installations intended to carry NG (a 2nd family gas as defined by BS EN 437).

Note: The Gas Safety (Installation and Use) Regulations (GS(I&U)R) define "gas" to include 1st, 2nd and 3rd family gases as well as other gases. The principles of IGE/GM/8 may be used for gases other than NG but suitable adjustments to parameters and requirements will need to be considered by a competent person.

- 2.4 This Part 4 of IGE/GM/8 deals with the operation and maintenance of relevant installations.

- 2.5 All pressures are gauge pressures unless otherwise stated.
- 2.6 Italicised text is informative and does not represent formal requirements.
- 2.7 Appendices are informative and do not represent formal requirements unless specifically referenced in the main sections via the prescriptive terms “must”, “shall” or “should”.

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 GB at the time of publication. Similar considerations are likely to apply in other countries, where reference to appropriate national Legislation is necessary.

All relevant Legislation must be applied and relevant ACoPs, official Guidance and referenced CoPs, 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.

- 3.1.2 Persons who operate and maintain meter installations must be competent to do so and have sufficient knowledge, skills and experience to carry out such work as is required. Compliance with GS(I&U)R must be achieved where those Regulations apply.

At the time of publication, the body with HSE approval to operate and maintain a register of businesses who are "members of a class of persons" is Gas Safe Register. Therefore, all businesses or self-employed gas fitters working on meter installations where GS(I&U)R apply must be registered with Gas Safe Register.

Persons deemed competent to carry out gas work are those who hold a current certificate of competence in the type of activity to be conducted, issued by a certification body accredited by the United Kingdom Accreditation Service (UKAS). UKAS issue certificates of competence under the National Accredited Scheme for Individual Gas Fitting Operatives (ACS).

Note: Where an ACS is not available for the activity, companies will need to ensure operatives have suitable competence to carry out maintenance and servicing.

- 3.1.3 Any meter installation shall be designed, installed, commissioned and maintained in accordance with the MAMCoP.
- 3.1.4 Most GTs operate an approval scheme under their Safety Case arrangements as a pre-requisite for authorising an OAMI to set any meter regulator or to break a regulator seal. Therefore, an OAMI must seek advice from the relevant GT before carrying out such procedures.

3.2 CONFINED SPACES REGULATIONS

These Regulations apply to a whole range of confined spaces. The supplier or designer 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 are required to 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.

3.3 CONTROL OF ASBESTOS AT WORK REGULATIONS

- 3.3.1 These Regulations set out standards for the identification, monitoring and assessment of work that may expose workers to asbestos and the measures needed to control the risk.

3.3.2 Employers cannot carry out any work that exposes, or is likely to expose, employees to asbestos unless an assessment of that exposure has been made. Employers have to set out steps to be taken to prevent, or reduce to the lowest level reasonably practicable, to that exposure. Employers have to carry out medical surveillance of employees if they work over a certain time limit.

3.3.3 These Regulations impose a duty on those with responsibilities for the repair and maintenance of non-domestic premises to find out if there are, or may be, asbestos containing materials within them; to record the location and condition of such materials and assess and manage any risk from them, including passing on of any information about their location and condition to anyone likely to disturb it.

3.3.4 Further information is available in HSG227. Other HSE documents with these Regulations are L143 and INDG 223.

3.4 **CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS (COSHH)**

3.4.1 These Regulations, which reinforce existing statutory obligations under Health and Safety at Work etc. Act (HSWA), impose a duty on employers to protect employees against risks to health, whether immediate or delayed, arising from exposure to substances hazardous to health, either used or encountered, as a result of a work activity. They also impose certain duties on employees.

3.4.2 Under COSHH, work is not be carried out which is liable to expose employees to hazardous substances unless the employer has made a suitable and sufficient assessment of the risk created by the work and the steps that need to be taken to comply with these Regulations. After assessing the risk, it is necessary to inform employees of the risks and to carry out the appropriate training and instruction to ensure the risks are minimised. In certain cases, control measures such as ventilation or personal protective equipment may be necessary and, where provided, they are required to be used.

3.5 **DANGEROUS SUBSTANCES AND EXPLOSIVE ATMOSPHERES REGULATIONS (DSEAR)**

These Regulations are concerned with protection against risks from fire, explosion and similar events arising from dangerous substances used or present in the workplace. The Regulations require that risks from dangerous substances are assessed, eliminated or reduced. They 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. and provision of information, training and use of dangerous substances. These Regulations also require the identification of pipelines and containers containing hazardous substances.

The following publications contain details of these Regulations and their application:

- L138
- INDG 370.

3.6 **ELECTRICITY AT WORK REGULATIONS**

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

They 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.

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

Note: A "Memorandum of Guidance on the Electricity at Work Regulations, 1989" is available from Her Majesty's Stationery Office (HMSO) and gives useful information on the Regulations. Further advice is contained in HSR25.

3.7 **GAS ACT**

The Gas Act, as amended, places duties on either the GT, gas supplier or consumer for meters to be kept in proper order. These duties are to ensure a meter by which the quantity of gas supplied is registered is in proper order for correctly registering the quantity of gas supplied.

The relevant schedule of the Gas Act dealing with these issues is Schedule 2B, an extract of which is given in Appendix 4.

3.8 **GAS (CALCULATION OF THERMAL ENERGY) REGULATIONS**

These regulations provide for the calculation of thermal energy of gas conveyed by GTs to premises, or to pipelines operated by other GTs, on the basis of the calorific values and volumes of gas conveyed. The calorific values of the gas may be either determined by, or declared by, the GT in accordance with the Regulations. The metered gas volumes may be adjusted for the temperature, pressure and compressibility factor of the gas.

Regulation 2 paragraph 4(b) allows, by agreement between a GT and relevant licence holder or owner, or occupier of a particular premises; for the calculation of the energy conveyed to those premises to be determined by apparatus operated and maintained only for the purposes connected with the conveyance of gas to those premises, i.e. calorific value specific to that site.

Information on converting the actual volume measured into the volume at standard conditions, the methods of determining daily calorific values, and the calculation of thermal energy, is given in IGEM/GM/8 Part 1.

3.9 **GAS (METERS) REGULATIONS**

These Regulations prescribe the standards for diaphragm and non-diaphragm gas meters for UK national requirements. They prescribe leakage requirements for all gas meters and pressure absorption limits for diaphragm meters. The Regulations are silent on pressure absorption limits with respect to other technologies.

These Regulations also cover:

- the re-examination of disputed meters
- the periodic overhaul of meters
- meters not stamped by, or on the authority of, a meter examiner.

These Regulations also give powers to the Secretary of State to revoke any approval of pattern and construction which was granted under the Gas Act.

These Regulations state the offences on suppliers for not overhauling meters in accordance with requirements and not replacing meters subject to a revocation of approval within a required period.

Note: Section 17 and Schedule 2B of the Gas Act 1986 (see Appendix 4), as amended, deals with the meter testing and stamping for gas meters used for ascertaining the quantity of gas supplied through pipes and limits the maximum flow rate, if measured at a temperature of 15°C and a pressure of 1013.25 mbar, to 1600 m³ h⁻¹.

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

3.10.1 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 factories, quarries and mines. However, the SPAA MAMCoP requires the principles of GS(I&U)R to be applied to meter installations in such premises.

3.10.2 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", i.e. Gas Safe registered.

3.10.3 The installer is required to check the safety of any meter installation 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 installer 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 installer is required to inform both the landlord/hirer, as well as the user, so that such faults can be rectified before further use.

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

3.11.1 GS(M)R place specific duties on GTs, or their emergency service providers (ESPs), for dealing with gas escapes from pipes on their network. 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.

3.11.2 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 GTs to notify the ESP should they, rather than the ESP, receive a report of an escape from the consumer.

Note: The Regulations refer to BG plc having these specific duties but BG plc no longer exists. National Grid plc is the entity that currently provides these services.

3.11.3 GS(M)R require GTs to investigate fire and explosion incidents upstream of the ECV and to send a report of the investigation to HSE. GTs 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 installation pipework.

3.11.4 Responsibility for investigating RIDDOR reportable incidents (see Sub-Section 3.16) as a result of an escape of incomplete combustion, escape of gas or inadequate removal of products of combustion is placed on gas suppliers. HSE is required to be notified before such investigations commence.

Note: Advice on dealing with gas escapes is contained in IGEN/SR/29.

3.12 **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 other persons such as members of the public who may be affected by the work activity.

3.13 **MANAGEMENT OF HEALTH AND SAFETY AT WORK REGULATIONS (MHSWR)**

In addition to specific duties under GS(I&U)R (see Sub-Section 3.10) 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.

3.14 **PRESSURE EQUIPMENT REGULATIONS (PER)**

These Regulations cover pressure equipment manufactured and sold throughout the European Community with a maximum allowable pressure greater than 0.5 bar. The Regulations deal with the manufacture, design and supply of pressure equipment. They impose duties on the responsible person.

Note: A "responsible person" is defined as "the manufacturer or his authorised representative established within the Community; or where neither the manufacturer nor his authorised representative is established within the Community, the person who places the pressure equipment or assembly on the market or puts it into use as the case may be."

"Pressure equipment" is defined as "vessels, piping, safety accessories and pressure accessories; where applicable, pressure equipment includes elements attached to pressurised parts, such as flanges, nozzles, couplings, supports, lifting lugs and similar."

The duties on the "responsible person" are to ensure that pressure equipment:

- satisfies the relevant essential requirements
- has undergone the relevant conformity assessment procedure, if applicable
- has had the European Community (CE) mark affixed by the manufacturer, if applicable
- has had the declaration of conformity drawn up by the manufacturer that the equipment is, in fact, safe.

Note: Not all pressure equipment is covered by PER. There are 21 categories of exceptions, detailed in Schedule 1 of PER.

The relevant conformity assessment procedure is determined by the classification of the pressure equipment according to criteria laid down in these Regulations. The classification system results in equipment being placed in one of five categories depending on the inherent level of hazard within the system.

The category then determines the range of conformity assessment modules relevant to that equipment. The modules are designed to allow the manufacturer to choose between a quality assurance route or type testing.

3.15 **PRESSURE SYSTEMS SAFETY REGULATIONS (PSSR)**

- 3.15.1 These Regulations 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 (WSoE) drawn up or approved by a competent person (as defined by PSSR).