

Gas Measurement Procedures
IGE/GM/8
Communication 1709

Non-domestic meter installations.
Flow rate exceeding $6 \text{ m}^3 \text{ h}^{-1}$ and inlet
pressure not exceeding 38 bar

Part 4 : Operation and maintenance



Founded 1863
Royal Charter 1929
Patron: Her Majesty the Queen

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SECTION 1 : INTRODUCTION

- 1.1 These Procedures supersede IGE/GM/1 Edition 2, Communication 1640, which is obsolete.
- 1.2 These Procedures have been drafted by an Institution of Gas Engineers and Managers (IGEM) Panel, appointed by IGEM's Gas Measurement Committee, and have 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 These Procedures cover the operation and maintenance of gas supply meter installations (See Sub-Section 2.1, Note 3) of capacity $> 6 \text{ m}^3 \text{ h}^{-1}$ and maximum operating pressure (upstream) (MOP_u) $\leq 38 \text{ bar}$.

With the exception of the few installations of $\text{MOP}_u > 38 \text{ bar}$, the majority of industrial and commercial meter installations can be operated and maintained by following IGE/GM/6 (for $\text{MOP}_u \leq 100 \text{ mbar}$ only) and/or IGE/GM/8.

Note: IGEM technical publications 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 $\text{MOP}_u \leq 100 \text{ mbar}$.

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 Sub-Section 2.1).

For a turbine meter installation of $\text{MOP}_u \leq 100 \text{ mbar}$, there are no recognized 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 $\text{MOP}_u > 38 \text{ bar}$, IGE/GM/4 applies.

- 1.5 These Procedures apply to new, onshore, gas supply installations only. They are not retrospective. However, where work needs to be undertaken on a meter installation, it is recommended that such an installation be brought into line with these Procedures. In particular, any unregulated by-pass needs to be removed or a regulator installed in the by-pass.
- 1.6 Installations covered by these Procedures have, traditionally, been owned by a gas transporter (GT) and installed by an Office of Gas Supply (OFGAS) Registered Gas Meter Installer (RGMI) or, latterly, an Office of Gas and Electricity Markets (Ofgem) Approved Meter Installer (OAMI). With the introduction of competition in metering systems, the market has opened to allow ownership and/or transfer of meter installations to other parties, including meter asset managers (MAMs) and consumers.

The de-regulation of the metering market has led to the need for new sets of rules, guidelines and recommendations. This has been addressed by the Ofgem Code of Practice for Gas Meter Asset Managers (MAMCoP), developed to cover

whole life management of gas meter installations. The Ofgem CoPs 1/a, 1/b and 1/c, which cover the installation of the meter only, may eventually be withdrawn as all installation aspects are covered in the MAMCoP; this is currently subject to discussion with industry. There has also been a review and harmonization of industry standards and CoPs to reflect the needs of the changing market. The publication of these Procedures is part of this process.

Note: Under the new arrangements, an Ofgem-approved MAM does not have to be an OAMI, but has an obligation to use an OAMI to install a meter.

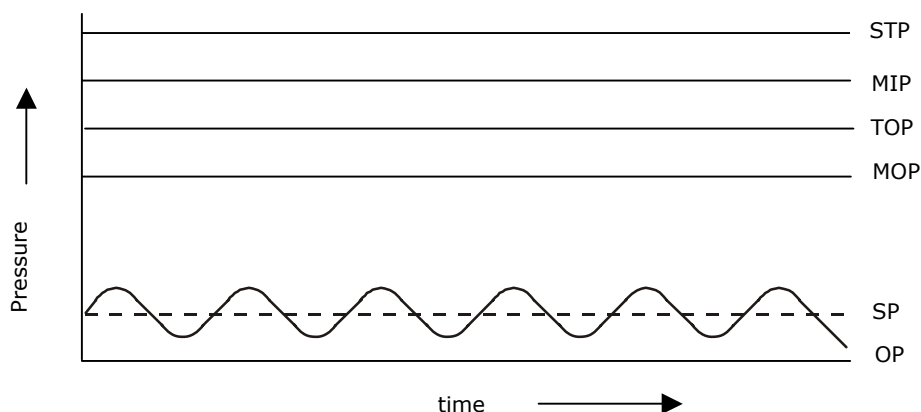
Notwithstanding Sub-Section 1.9, total compliance with IGE/GM/8 is necessary for installations and modules where the meter installation has to comply with the Ofgem MAMCoP, relevant scope.

1.7

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

Note: IGE/GM/8 Part 1 explains these new terms in greater detail.

Referring to Figure 1, note how OP is shown to oscillate about the set point (SP). Note also that MOP can be declared at a higher value than OP. The strength test pressure (STP) has to exceed MIP. This means that, at least with respect to integrity, the meter installation will withstand a fault pressure from the upstream system.



STP	=	Strength test pressure
MIP	=	Maximum incidental pressure
TOP	=	Temporary operating pressure
OP	=	Operating pressure
MOP	=	Maximum operating pressure
SP	=	Set point of, typically, the active regulator.

FIGURE 1 - OPERATIONAL PRESSURE LIMITS

1.8

These Procedures make use of the terms "should", "shall" and "must" when prescribing particular procedures. Notwithstanding Sub-Section 1.9:

- 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.

- 1.9 These Procedures do 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 proved, they should be adopted without waiting for modification to these Procedures. Amendments to these Procedures will be issued when necessary, and their publication will be announced in the Journal of the Institution and other sources, as appropriate.
- 1.10 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.
- 1.11 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 HS(G)48.
- 1.12 Requests for interpretation of these Procedures in relation to matters within their scope, but not precisely covered by the current text, should be addressed in writing to Technical Services, IGEM, Charnwood Wing, Holywell Park, Ashby Road, Loughborough, Leicester, LE11 3GH 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.

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SECTION 2 : SCOPE

- 2.1 These Procedures apply to all new, onshore, gas supply meter installations (hereafter referred to as "installations") (and defined in IGE/G/1) of flow rate (capacity) $> 6 \text{ m}^3 \text{ h}^{-1}$ and MOP upstream (MOP_u) $\leq 38 \text{ bar}$ and complying with IGE/GM/8 Part 1 (see also Note 7 below).

The following types of meter are covered:

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

Note 1: For domestic installations of capacity $\leq 6 \text{ m}^3 \text{ h}^{-1}$, intended to carry Natural Gas, BS 6400-1 or BS 6400-2 apply, as appropriate for MOP_u . For capacity $> 6 \text{ m}^3 \text{ h}^{-1}$ the principles of IGE/GM/6 or IGE/GM/8, as appropriate for MOP_u , may be applied.

Note 2: For installations of $\text{MOP}_u > 38 \text{ bar}$, IGE/GM/4 applies and IGE/TD/13 may be used with respect to the regulation of pressure.

Note 3: Primarily, IGE/GM/8 has been produced for primary meters and other meters, used for billing purposes. However, its 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 $\text{MOP}_u \leq 100 \text{ mbar}$. For other, "non-standard", installations of $\text{MOP}_u \leq 100 \text{ mbar}$, 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 procedures 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 these Procedures for existing installations complying with IGE/GM/1.

- 2.2 These Procedures cover 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 requirements of the Pipelines Safety Regulations (PSR). However, the installation may be subject to the requirements of the Pressure Systems Safety Regulations (PSSR).

- 2.3 These Procedures apply to installations intended to carry Natural Gas (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 Natural Gas but suitable adjustments to parameters and procedures 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 Procedures.

- 2.7 Appendices are informative and do not represent formal Procedures unless specifically referenced in the main sections via the prescriptive terms “should”, “shall” or “must”.

SECTION 3 : LEGAL AND ALLIED CONSIDERATIONS

3.1 GENERAL

- 3.1.1 These Procedures are 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 design meter installations must have a knowledge and understanding of the standards and regulations that apply to ensure that the completed plans will produce a safe and satisfactory installation.

Persons who install or maintain meter installations must be competent to do so and 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 the Council for Registered Gas Installers (CORGI). Therefore, all businesses or self-employed gas fitters working on meter installations where GS(I&U)R apply must be registered with CORGI.

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), to issue certificates of competence under the Nationally Accredited Certification Scheme for Individual Gas Fitting Operatives (ACS).

Further advice on training and competency is given in IGE/SR/9.

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 Ofgem MAMCoP.

- 3.1.4 Any meter of capacity $\leq 1600 \text{ m}^3 \text{ h}^{-1}$ used to render a charge must be approved and stamped, as required by the Gas Act.

- 3.1.5 Some 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 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.

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

In addition to specific duties under GS(I&U)R (see Sub-Section 3.4) 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.

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

3.4.1 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 Ofgem MAMCoP requires the principles of GS(I&U)R to be applied to meter installations in such premises.

3.4.2 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. CORGI registered.

3.4.3 The installer must 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 (see clause 3.4.2) and is competent to carry out such work. If any serious fault is found, the installer must inform both the landlord/hirer, as well as the user, so that such faults can be rectified before further use.

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

3.5.1 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.

3.5.2 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.

3.5.3 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.

3.5.4 Responsibility for investigating RIDDOR reportable incidents (see Sub-Section 3.9) 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: Advice on dealing with gas escapes is contained in IGE/SR/20.

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 HMSO and gives useful information on the Regulations. Further advice is contained in HS(R)25.

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

3.7.1 These Regulations, which reinforce existing statutory obligations under 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.

3.7.2 Under COSHH, work must 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 the 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 must be used.

3.8 **CONTROL OF ASBESTOS AT WORK REGULATIONS**

3.8.1 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.

3.8.2 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, that exposure. Employers have to carry out medical surveillance of employees if they work over a certain time limit.

3.8.3 The 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 of any information about their location and condition to anyone likely to disturb them.

3.8.4 Further information is available in HS(G)227. Other AcoPs associated with these Regulations are HS(L)27, HS(L)28 and HS(L)127.

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

3.9.1 RIDDOR require employers, self employed people or those in control of work premises to report certain work related accidents, diseases and dangerous occurrences.

3.9.2 Other people have duties to report certain gas incidents which may not appear to be work related:

- Death or major injury arising out of the distribution, filling, import or supply of Natural Gas should be reported by the conveyor
- Dangerous gas fittings (as defined in RIDDOR) should be reported by a "member of a class of persons".

3.9.3 Major injuries, death and dangerous occurrences must be notified immediately, for example by telephone, to the enforcing authority by the "responsible person" as defined by RIDDOR. Reports can be made to the Incident Contact Centre by:

- telephone on 0845 300 9923
- fax on 0845 300 9924
- email to riddor@natbrit.com
- internet at www.riddor.gov.uk or
- via a link from HSE website at www.hse.gov.uk.

It is also possible to report to the local HSE office by telephone and then follow up with a written report on the correct F2508 form within the required timescale (10 days, or 14 days for dangerous gas fittings). Other reports should be made as soon as practicable and within 10 days of the incident.

3.9.4 HS(L)73 contains detailed guidance on RIDDOR, including a full list of injuries etc. that need reporting. The HSE leaflets HS(E)61 and MISC 310 give some information on RIDDOR and how to report.

3.10 **PROVISION AND USE OF WORK EQUIPMENT REGULATIONS (PUWER)**

3.10.1 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.

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

3.10.3 More information on the Regulations can be found in HS(L)22. Free leaflets include INDG 291 and INDG 229.

3.11 **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 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.