

Gas Measurement Procedures
IGE/GM/8
Communication 1708

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

Part 3 : Fabrication, installation, testing and
commissioning



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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- 1.1 These Procedures supersede IGE/GM/1 Edition 2, Communication 1640, which is obsolete.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 fabrication, installation, testing and commissioning
 - Part 4 covering operation and maintenance
 - Part 5 covering notices and labels.
- 1.4 These Procedures cover the fabrication, installation, testing and commissioning 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) ($\text{MOP}_u \leq 38 \text{ bar}$).

With the exception of the few installations of $\text{MOP}_u > 38 \text{ bar}$, the majority of industrial and commercial meter installations can be designed 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, 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 harmonisation 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.

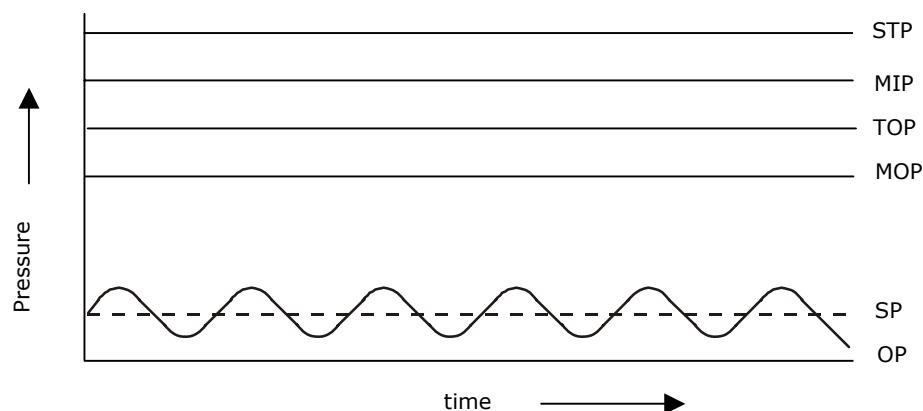
Notwithstanding Sub-Section 1.9, total compliance with IGE/GM/8 is necessary for installations and modules where the meter installation has to comply with the Ofgem MAMCoP, relevant scope.

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 IGE 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: Appendix 11 of IGE/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.

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:

- 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 Notwithstanding the above, these Procedures do not attempt to make the use of any method or specification obligatory against the judgment 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, The Institution of Gas Engineers and Managers, 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 IGE, this does not relieve the responsible engineer of any of his or her obligations.

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) $\leq 38 \text{ bar}$.

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 .

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.

- 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 These Procedures address the fabrication, installation, testing and commissioning of meter 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 (see also IGE/GM/8 Part 1).

Persons who install, commission 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).

- 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.

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 **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.

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.

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

3.6.1 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.

3.6.2 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 (PPE) may be necessary and, where provided, they must be used.

3.7 **CONTROL OF ASBESTOS AT WORK REGULATIONS**

- 3.7.1 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.
- 3.7.2 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.
- 3.7.3 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.
- 3.7.4 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.

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

- 3.8.1 RIDDOR require employers, self employed people or those in control of work premises to report certain work related accidents, diseases and dangerous occurrences.
- 3.8.2 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 (NG) should be reported by the conveyor
 - dangerous gas fittings (as defined in RIDDOR) should be reported by a "member of a class of persons".
- 3.8.3 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.

- 3.8.4 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.

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

- 3.9.1 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.
- 3.9.2 The Regulations place duties on employers in relation to selection, suitability, maintenance, inspection, installation, instruction and training, prevention of danger and control of equipment.
- 3.9.3 More information on the Regulations can be found in HS(L)22. Free leaflets include INDG 291 and INDG 229.

3.10 **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.

3.11 **BUILDING REGULATIONS**

3.11.1 **England and Wales (As Amended)**

Building Regulations are Statutory Instruments that must be followed when engaged in any building work. They are written in a format of broad Regulations, setting out simple requirements in a Separate Schedule. Suggested ways of complying with these Regulations are contained in Approved Documents.

The Approved Documents that apply to gas work are:

- A (Structure)
- B (Safety in Fire)
- F (Ventilation).

3.11.2 **Building Standards (Scotland) Regulations and Amendments**

The Building Standards (Scotland) are written directly as Regulations within the Statutory Instrument. The Regulations can be satisfied:

- by compliance with Technical Standards published by the Scottish office
- conforming with the provisions of "deemed to satisfy" documents, for example British Standards
- other equivalent means.

3.12 **CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS (CDM)**

These Regulations impose duties on designers, clients (and their agents), developers, planning supervisors and principal contractors. Not all the regulations apply to all construction projects. Further information is given in HS(G)224. For a notifiable project (as defined in CDM) the planning supervisor must notify HSE before construction work commences. Construction includes the alterations, repair, redecoration, maintenance, de-commissioning or demolition of a structure. It also covers installation, commissioning, maintenance or removal of gas services.

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

3.13.1 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 drawn up or approved by a competent person (as defined by PSSR).

3.13.2 Relevant fluids for the purpose of this document would be natural gas at a pressure greater than 0.5 bar above atmospheric pressure. 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 the Regulations. 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 (see para 110b of HS(L)122). The regulations also apply to pipelines and their protective devices in which the pressure exceeds 2 barg (see Sch 1 part 1 item 5 of HS(L)122).

3.13.3 More information is available in HS(L)122 and some information is presented in the HSE free leaflets INDG 261 and INDG 178.

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

These Regulations incorporate:

- ATEX Directive 94/9/EC (ATEX 95) – Safety of Apparatus
- ATEX Directive 99/92/EC (137A) – Safety of Installation
- Chemical Agents Directive (CAD) 98/24/EC.

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. The Regulations also require the identification of pipelines and containers containing hazardous substances.

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

- HS(L)138
- HS(L)137
- HS(L)136
- HS(L)135
- HS(L)134
- INDG 370.

3.15 **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 service 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 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 the 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.

3.16 **MANUAL HANDLING REGULATIONS**

These Regulations seek to reduce the very large incidence of injury and ill-health arising from the manual handling of loads at work. More than 1 in 4 of all reportable injuries are caused by manual handling. These accidents do not include cumulative injuries, particularly to the back, which can lead to physical impediment or even permanent disablement.

The Regulations place duties upon employers in respect of their own employees. Identical duties are placed on the self-employed in respect of their own safety.

3.17 **LIFTING OPERATIONS AND LIFTING EQUIPMENT REGULATIONS**

These Regulations build on POWER (see Sub-Section 3.9).

Practical guidance on the Regulations is given in HS(L)113.

3.18 **THE 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 IGE/GM/8 Part 4.

SECTION 4 : GENERAL OBJECTIVES AND PRINCIPLES

4.1 GENERAL

- 4.1.1 It is preferable that fabrication, installation, testing and commissioning of a meter installation be a continuous operation but it is recognised that, in many instances, this will not be practicable. If it is necessary to suspend operations before commissioning is completed, the installation shall be left in a safe condition and sealed off by means of caps, plugs, spades or blind flanges, as appropriate (reference should be made to the relevant parts of IGE/UP/1, IGE/UP/1A, IGE/UP/1B and IGE/UP/1C, as appropriate).
- 4.1.2 A competent person should be nominated to take overall control to ensure safe and efficient fabrication, installation, testing and commissioning.

4.2 QUALITY ASSURANCE

4.2.1 Quality management system

- 4.2.1.1 A formalised quality management system, which meets a suitable quality standard such as BS EN ISO 9001, should be adopted, to include an appropriate quality manual and quality plan.
- 4.2.1.2 The quality management system should be accredited and certified by an approved independent certification body.

4.2.2 Quality plan

- 4.2.2.1 The quality plan should demonstrate that any installation meets the required technical specification and that design, manufacture, coating, testing and commissioning complies with relevant legislation, standards and CoPs. This should embrace the safety and suitability of any installation for the conditions of use.
- 4.2.2.2 As a minimum, the quality plan should include:
- design control
 - formal arrangements for the notification of any agreed changes
 - control of materials and assembly
 - control of testing procedures and equipment
 - control of commissioning procedures and site personnel
 - nominated contacts for issues of;
 - production
 - technical
 - field service
 - product identification and, where required, traceability.

Particular emphasis should be placed on the inspection of materials, welding, coatings and testing. Any workmanship or materials not in accordance with these Procedures or the design specification should be rejected.

4.2.3 Records

A record of all notifications, materials and test certifications, weld and coating records, all related documents and inspection results shall be kept with the records of the installations.

4.3 **WORK PROCEDURES**

4.3.1 Before any work commences, it should be established that all materials, components and work procedures are in accordance with the design specifications and that satisfactory material certificates have been provided.

4.3.2 Procedures should be adopted to control and record the transport, receipt, storage, issue and use of materials and components.

4.3.3 Before commissioning, strength and tightness testing, purging and commissioning procedures should be prepared and issued to personnel undertaking the work.

4.4 **CARE OF MATERIALS AND EQUIPMENT**

4.4.1 Care shall be taken in transporting, storing and installing, meters, regulators, plant and equipment to minimise damage or loss due to:

- ingress of moisture or other contamination
- impact
- vandalism
- mishandling,

and to prevent injury or ill health to workers.

4.4.2 Any meter, meter module or associated equipment should be inspected upon receipt and any damage or suspected damage reported to the equipment supplier.

4.4.3 Pipework, fabrications and components should be protected adequately during handling, transportation and storage. They should be inspected before use and, if any are found to be damaged or defective, they should not be incorporated unless repairs can be carried out as agreed by those responsible for the design and construction.

4.4.4 Meters and associated instrumentation are precision devices and, as such, should be treated with care.

4.4.5 Any meter and/or associated equipment shall:

- be stored in accordance with the manufacturer's recommendations
- wherever possible, be stored in their original packaging
- be stored in a clean, dry place prior to installation
- be protected in storage from damage with particular attention being paid to indexes, instruments, official seals, etc.
- be secure in storage from the detrimental effects of tampering, interference, vibration, magnetic forces, sunlight or other influences
- be protected against the ingress of foreign material and moisture prior to installation.

4.4.6 Temporary caps, covers, and other protective measures should be retained in position until the component or equipment is ready to be installed.

SECTION 5 : EXCHANGE OF INFORMATION

5.1 GENERAL

- 5.1.1 Effective fabrication, installation, testing and commissioning of a meter installation is dependent upon all the parties involved adequately exchanging appropriate information. The designer of the installation shall provide the information to the personnel involved.

Note: The exchange of information will, in most cases, be a two-way exercise in order to arrive at a workable solution to which all parties agree.

- 5.1.2 All interested parties should be notified of the date on which commissioning is to be carried out.

5.2 INFORMATION CONCERNING THE NETWORK

- 5.2.1 Information pertaining to the Network shall be obtained. Such information should include:

- confirmation of a live gas service pipe (for an existing service)
- Network design minimum pressure (DmP_u)
- Network lowest operating pressure (LOP_u)
- Network maximum operating pressure (MOP_u)
- Network maximum incidental pressure (MIP_u) or Network design maximum incidental pressure ($DMIP_u$) whichever is provided
- Network design pressure (DP_u)
- planned or actual nominated energy value of the service
- any constraints that the GT has imposed on the service, meter installation, or the use of any housing or compound.

Note: Often, much of the above information is standard across a GT's Network. Appendix 3 provides guidance on National Grid's standard Network operating conditions. The guidance may not apply for another GT.

- 5.2.2 If any information pertaining to the size, design, outlet connection detail, position of the ECV etc., on an existing service is not available, the detail shall be obtained, for example from the GT, utility infrastructure provider (UIP), site visit, etc.

- 5.2.3 Where a meter installation exchange is planned and the ECV is not upstream of the whole meter installation, the MAM shall contact the GT, prior to exchange, in order to relocate the ECV in line with IGE/G/1.

5.3 INFORMATION CONCERNING THE FABRICATING AND INSTALLING OF AN INSTALLATION

Prior to fabricating or installing a meter installation, the installation designer shall provide the meter installer with the following information, as a minimum:

- details of the design of the installation, sufficient to enable the meter installer to correctly assemble the components

Note 1: It is important that any difficulties in achieving the original design requirements are fed back to the designer from those involved with the fabrication, installation, testing or commissioning processes. Failure to do so may compromise the integrity of the installation.

Note 2: The amount of information that will be required will vary significantly depending upon the size and complexity of the installation. For a small installation of $MOP \leq 100$ mbar, it may be in the form of a parts list and schematic/exploded drawing whereas, for a larger or higher pressure installation, it may be in the form of a detailed design file which includes specifications, drawings, etc.

- confirmation that all relevant pre-delivery strength tests have been successfully completed
- details of any components that may be damaged by STP, for example the meter
- DP, MOP and MIP for all parts of the installation, including (but not limited to) pipework and components such as the meter, regulating and safety equipment, and valves

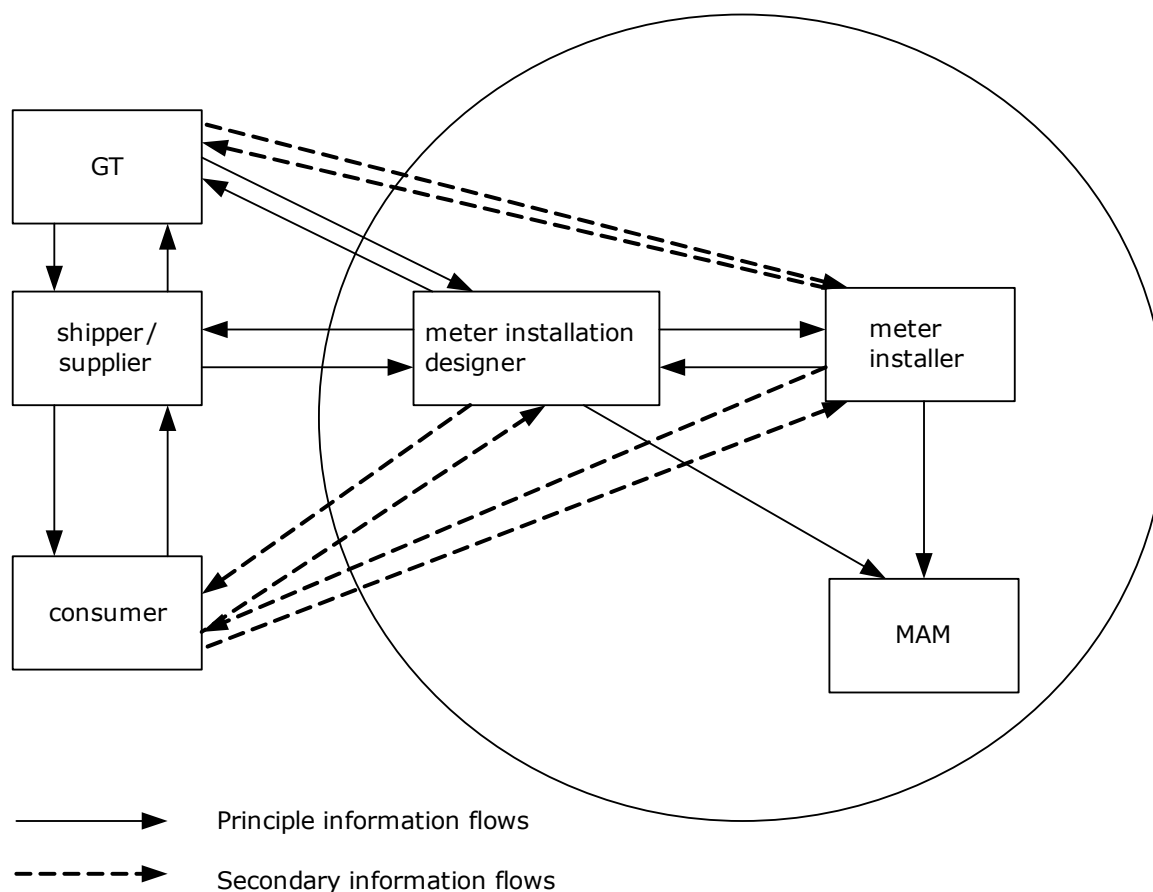
Note: If $DMIP_u$ is supplied by the GT, this is used instead of MIP_u .

- the design capacity of the installation
- the settings for the meter regulator(s), creep relief(s), monitor regulator(s) and slam-shut valves (SSVs) as appropriate, that have been agreed with the gas consumer and approved by the GT. Alternatively, the designer should inform the installer of the agreed metering pressure, the accuracy of the pressure control/safety equipment and the performance envelope that the meter installation has to achieve.

5.4 **INFORMATION CONCERNING THE LOCATION OF A METER INSTALLATION AND SUITABLE WORK AREA**

Prior to on-site fabricating or installing a meter installation, the meter installer shall obtain the following information, from the installation designer or, if appropriate, from the gas consumer or their representative:

- a site drawing indicating the position of the proposed installation or, where a drawing is not otherwise required, a suitable record of details of the location
- the location of the installation as agreed between the GT, supplier/shipper, designer and consumer, and whether the proposed housing, is a purpose-built housing, an outside compound, or an existing building
- a hazardous area drawing for the proposed installation (if available)
- details of any nearby ignition sources, building air intakes or other potential hazards, for example power lines, etc. that could affect commissioning
- details of any hazardous area that may impinge on the installation other than that which is a consequence of the presence of the installation itself
- any relevant restrictions that may apply to the location of the installation, for example restricted vehicular access, planning constraints, etc.
- any relevant restriction that may affect the type of work that can be undertaken at the location of the installation.



Note 1: The designer, installer and MAM may all be the same company.

Note 2: The MAM may undertake the information-gathering responsibilities of the designer and then sub-contract the actual design.

FIGURE 2 - INFORMATION FLOWS RELATING TO DESIGN, FABRICATION AND INSTALLATION

SECTION 6 : PLANNING AND PREPARATION

6.1 PLANNING

- 6.1.1 The need and responsibility for any civil work and fabrication shall be established at an early stage in the planning process.
- 6.1.2 Prior to construction work, any necessary planning permission must have been obtained, and this shall be carried out by the consumer or site owner, as appropriate.
- 6.1.3 Consideration shall be given to gaining access for the installation components, or module and any equipment (including lifting equipment) when choosing the proposed location of the installation.

6.2 SAFE HANDLING OF EQUIPMENT

- 6.2.1 A safe means of handling, that will not result in damage, shall be identified for each item of equipment. If the proposed location prevents this, a more appropriate location shall be identified and agreed with the supplier, consumer and GT prior to undertaking any installation work.

Note: Normally, this will be the installation designer's responsibility.

- 6.2.2 Where necessary, lifting equipment shall be used and consideration shall be given to:
- prevention of damage to overhead services
 - proximity of overhead cables
 - load-bearing characteristics of the ground and the susceptibility of underground services to damage
 - maximum safe working loads and radius of operation
 - use of slings or other equipment designed to avoid damage to pipes, equipment or coatings.

Note: IGE/TD/1 Edition 4 Supplement 1 provides guidance on handling of steel components.

6.3 HAZARDOUS AREAS

- 6.3.1 Any hazardous area that may affect the installation, testing or commissioning process shall be determined and appropriate precautions taken during these operations.

Note 1: Such areas may exist as a result of:

- adjacent gas consumer-operated processes
- the testing/commissioning process (which may require gas to be manually vented)
- the presence and operation of the commissioned installation.

Note 2: Areas that may become hazardous as the result of the presence of flammable gas are classified in the UK as Zone 0, 1, or 2 and are defined in BS EN 60079.

Note 3: Some information on test equipment selection is provided in IGE/UP/1 and BS EN 1127.

Test equipment shall have the appropriate certification for the zone in which it will be used.

- 6.3.2 A hazardous area drawing or equivalent shall be produced and maintained as a record to enable the correct selection and siting of electrical equipment (and other potential sources of ignition) to be undertaken for the commissioning process, initial installation and any future modifications.

Note: Further information on the production of a suitable hazardous area drawing is provided in IGE/GM/7, IGE/SR/23 or IGE/SR/25 as appropriate.

6.4 **SUITABILITY OF THE PROPOSED LOCATION AND HOUSING**

The proposed location and housing shall be in accordance with the relevant procedures in IGE/GM/8 Part 2. Prior to commencing any assembly or on-site fabrication, the suitability of the proposed location and housing shall be verified.

6.5 **EMERGENCY ARRANGEMENTS IN THE EVENT OF A GAS ESCAPE OR A DANGEROUS SITUATION**

Emergency arrangements shall be in place to take into account the primary objectives, which are to:

- ensure the safety of the public and personnel
- prevent damage to the installation and other property
- minimise the extent and effects of the emergency.

Reference shall be made to Appendix 7.

6.6 **RESPONSE ARRANGEMENTS IN THE EVENT OF A FAILURE OF GAS SUPPLY OR A MAJOR FAULT**

6.6.1 Suitable arrangements to respond in the event of the urgent need to respond to a failure of gas supply or a major fault should be prepared. These should be kept updated for the guidance of all personnel connected with operation and maintenance.

The arrangements should cover the reasonably foreseeable urgent situations arising from the supply of gas to or from the installation, or resulting from leakage. They should detail the arrangements for alerting other persons who may be affected by the situation.

6.6.2 The organisation of routine work and the provision of communications should be such that sufficient additional supervisory and maintenance personnel can be alerted and immediately dispatched to the installation(s) concerned, in the event of an urgent situation arising.

6.6.3 Arrangements should be in place to cover urgent situations arising outside normal working hours and these should include procedures for calling out personnel.

6.6.4 Periodic tests or exercises should be carried out to confirm the effectiveness of the response arrangements.

6.6.5 Arrangements should be reviewed, and amended as necessary, as a result of testing and of any practical experience gained during real situations.

SECTION 7 : SITE SAFETY

7.1 GENERAL

7.1.1 The safe fabrication, installation, inspection and examination of works should be ensured. All necessary notifications should be made and measures taken for the protection of personnel, members of the public, property and the environment that might be affected by the work.

7.1.2 Arrangements should be made to obtain authorisations and permits to work, where required.

Note: Guidance on permits to work is provided in "Guidance on permits to work systems in the petroleum industry" published by HSC, and in IGE/SR/9.

7.1.3 Attention must be paid to relevant statutory requirements (see Section 3).

The health and safety at work of all personnel must, so far as is reasonably practicable, be ensured by the provision of suitable instruction, training and equipment.

Appropriate personal protective equipment must be worn at all times when undertaking work on site.

7.1.4 In areas classified as hazardous (see IGE/GM/7 or IGE/SR/25, as appropriate) any equipment to be used must be correctly certified for the position of use.

Note: IGE/GM/7 and IGE/SR/25 provide guidance on calculating hazardous areas for live installations in normal operation. When working on a meter installation, it is possible to undertake a live assessment of the conditions and make additional checks, for example atmosphere checks with certified equipment, to render a safe working area.

7.1.5 Appropriate supervision should be provided to ensure that all necessary safety precautions are taken for the protection of personnel, members of the public and property that might be affected by the works.

7.2 ARRIVAL ON SITE

On arrival on site, the following actions shall be carried out in a safe and professional manner:

- report to the appropriate consumer, or their representative, and notify them of presence on site and the purpose of the visit
- where applicable, enter the date and time of visit in the site log book and, where appropriate, notify the company's system operator of presence on site
- undertake any site safety induction required and, while on site, comply with any site-specific safety requirements advised by the consumer and/or MAM
- identify the location of the correct meter installation (or site of the proposed installation) and obtain any key(s) required to gain access
- park any vehicle in a safe area, with consideration to other road/site users
- in the event of a smell of gas, take appropriate action (see Appendix 7)
- gain familiarity with the installation location and its surroundings, identify the means of access/egress and note any local instructions and specific hazards which need to be taken into consideration during the site visit, for example low overhead cables.

7.3 TAMPERING OR UNAUTHORISED OFFTAKE OF GAS

Where there is evidence of tampering or unauthorised offtake of gas, this shall be reported to the appropriate organisation. This will, normally, be the GT but may be the gas supplier/shipper. Any related advice given by the GT/supplier/shipper should be followed.

Note: Important evidence could be destroyed if any work is carried out before an investigation is made. If available, use a camera to gain photographic evidence.