Institution of Gas Engineers & Managers

Metering/emergency service provider Natural Gas training specification

Utilisation sector

IGEM/IG/1 Edition 2 Supplement 3
Communication 1870

ASSIDUE EXQUIRENDO SERVIRE

ENERGY & UTILITY SKILLS

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SECTION 1: INTRODUCTION

1.1 This Specification supersedes the previous metering/emergency service provider (ESP) Natural Gas training Specification previously issued by Energy and Utility Skills (E&US).

1.2 This Specification relates to new entrants into the gas industry wishing to become a 'class of persons' who will be required to undertake an industry recognised training course before being able to take an assessment to include the relevant matters of gas safety criteria to be become Gas Safe registered.

Note: These include the following recognised routes to registration, which are:
- *Nationally accredited certification scheme for individual gas fitting operatives (ACS)*
- *Framework qualifications*
- *Apprenticeship standards*.

1.3 This Specification has been facilitated by IGEM and E&US and has been approved by IGEM's Gas Utilisation Committee, Gas Measurement Committee and IGEM's Technical Coordinating Committee. The Specification has also been approved by the Standards Consultation Forum (SCF) and the Strategic Management Board (SMB).

This Specification is a supplement to the IGEM/IG/1 Standards of training in gas work document and recognised as required in ACoP L56.

1.4 The relevant parts of this Specification are also applicable to persons wishing to extend range or scope (as defined in Guidance Note 8 (GN8)).

1.5 This Standard makes use of the terms "shall" and "should" when prescribing requirements:

- the term "shall" prescribes a requirement which, it is intended will be complied with in full and without deviation
- the term "should" prescribes a requirement which, it is intended will be complied with unless, after prior consideration deviation is considered to be acceptable.

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

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

These will be submitted to the relevant Committee for consideration and advice.

1.7 This Specification was published in May 2023.

SECTION 2: SCOPE

2.1 This training Specification covers training for:

- new entrants to the gas industry wishing to work in the metering and emergency service provider Natural Gas utilisation sector working within the scope of the Gas Safety (Installation & Use) Regulations (GS(I&UR)) those persons currently or previously registered seeking re-certification (optional)
- those persons wishing to extend their range (including blends of up to 100% hydrogen) or scope (refer to GN8 for onsite experience requirements).

2.2 This Specification is designed to cover the breadth of the industry including the legal requirements, knowledge and understanding, performance criteria, and on-site work experience that will be undertaken in a work placement supervised by a Mentor, related to gas meter installations and dealing with reported gas emergencies.

2.3 The requirements will include the minimum time spent on each subject along with the activities that are required to be undertaken. The minimum overall programme duration is four months and the maximum time spent to complete the training is expected to be two years.

Note: There may be exceptions where apprenticeships have been designed for longer than 2 years.

2.4 Italicised text is informative and does not represent formal requirements.

2.5 Appendices are informative and do not represent formal requirements unless specifically referenced in the main sections via the prescriptive terms "should", or "shall".

SECTION 3: TRAINING AND EVALUATION

'Off-site' training is that which the new entrant is trained in a classroom environment for theory input and practical workshop areas (which simulate the on-site environment) for demonstration and skills practice. The balance between theory and practical work will be dependent on the content of the subject.

'On-site' training and experience is to be gained from work undertaken under the direct supervision of a mentor. On-site training is to cover the scope and range of the technical specification. Records of the work carried out, the methods undertaken and any other relevant information is to be retained to build a portfolio of evidence to be verified by the training provider.

3.1 Arrangements shall be in place to ensure that the new entrant and the Mentor know what is expected of them.

3.2 The marking scheme for the evaluation shall be open and transparent to the new entrant and the trainer.

3.3 Arrangements shall be in place for moderation and an independent review.

3.4 **TRAINING**

3.4.1 **Minimum off-site duration**

The minimum guided learning hours for the core competencies shall be 196 hours. For the purpose of minimum guided learning hours, for consecutive learning days, each day shall be no longer than 7.5 hours or 37.5 hours per week, or in the instance of day release, a maximum of 10 hours. The subjects to be covered in the core unit shall be as detailed in Table 1 Appendix 1 and the training is to cover both the theoretical and practical aspects of the work.

The minimum guided learning hours and the subjects covered in the optional competencies shall be as per Table 2 in Appendix 2.

Note: Where a candidate provides verifiable evidence of prior learning (matching the requirements in Appendix 1 and Appendix 2), then a reduction in learning hours may be applied. The prior learning is to be cross referenced to the qualification held and the learning hours reduced accordingly. The candidate is to undertake a 'documented technical review' to confirm their current knowledge level prior to any reduction being applied. Results of the technical review is be retained in the candidates file along with details of the subjects not covered within the programme due to the prior learning. Any reduction in learning hours is to be agreed with the Recogniser of Training.

3.4.2 **Minimum on-site tasks and duration**

The portfolio of on-site experience shall provide evidence representative of a minimum of 10 weeks (based on 37.5 hours per week) industry experience and be relevant to the elements in the training/technical specification (Appendix 1, 2 or 3).

Evidence recorded shall meet the requirements of Appendix 3 and is to be:

- work completed by the new entrant, unassisted
- observed and endorsed by the mentor
- cross referenced to an evidence matrix to indicate where within the portfolio specific activities have been successfully completed on the required number of occasions.

Evidence of the work carried out by the new entrant shall include the following information:

- site address
- postcode
- date of work
- description of work and sufficient supplementary evidence to allow the work to be verified.

The new entrants should also document the time spent supporting the mentor or witnessing the mentor undertaking work relevant to the training/technical specification. This may include any activities relevant to Appendix 1, 2 or 3.

Note: It is accepted that not all of the time spent by the new entrant gaining experience will be directly related to 'gas work' but will assist the new entrant in gaining 'whole job' competencies.

3.5 EVALUATION OF LEARNING

3.5.1 The training provider shall undertake an evaluation of the learning.

3.5.2 The evaluation of the learning at the training centre shall be a mixture of verbal, written and practical tests that need to be conducted during and/or at the end of the training.

3.5.3 The evaluation shall confirm that new entrants have a full understanding of all matters of gas safety (relating to the competency being undertaken) prior to a certificate being issued.

3.5.4 The evaluation shall include a review of the portfolio evidence that the new entrant has submitted to establish that they have undertaken the required tasks (under direct supervision).

3.6 CERTIFICATE

A certificate shall be presented to each successful new entrant. Detailing, as a minimum:

- name of the new entrant
- name of the training provider and their unique Gas Safe Register Training Centre Code
- National Insurance number (or unique identification number)
- title of the training programme, listing the range and scope undertaken
- date the certificate was awarded
- name of the organisation issuing the certificate.

APPENDIX 1: PART 1 – Off-site training (core competencies)

Utilisation (Subjects)

The minimum guided learning hours assigned to each subject are detailed below:

METERING/ESP CORE COMPETENCIES	MINIMUM GUIDED LEARNING HOURS
Safety, Legislation and Standards	14
Gas Emergency Actions and Procedures	14
Products and Characteristics of Combustion	21
Ventilation for Gas Burning Appliances	21
Installation of Pipework and Fittings	35
Tightness Testing and Purging	21
Checking and/or Setting Meter Regulators	14
Unsafe Situations, Emergency Notices and Warning Labels	21
Operation and Positioning of Emergency Isolation Controls and Valves	7
Chimney Standards	14
Re-establish Existing Gas Supply and Re-light Appliances	14
Total:	**196**

TABLE 1: MINIMUM GUIDED LEARNING HOURS FOR METERING/ESP CORE COMPETENCIES

A1.1 **SAFETY, LEGISLATION AND STANDARDS**

A1.1.1 **Performance Criteria**

In relation to electrical supplies, tools and components you will need to be able to:

P1 Visually inspect electrical power tools for safe condition before use.

A1.1.2 **Knowledge and Understanding**

In relation to working on downstream gas installations, you will need to know and understand:

K1 Application of Gas Safety Management Regulations

K2 Application of the Gas Safety (Installation and Use) Regulations (GS(I&U)R)

K3 Building Regulations, or their equivalents in the devolved administrations, including but not limited to:

- gas supplies and appliances in higher risk buildings
- notifications.

K4 Safety precautions when other hazardous materials (COSHH) are encountered whilst working in the downstream gas industry.

K5 Your responsibilities regarding health, safety and the environment.

This should include an adequate knowledge of:

- relevant associated services such as water and electricity
- the potential for exposure to asbestos
- the dangers these may give rise to
- the precautions to take.

K6 Equipotential bonding

K7 Use of personal protective equipment.

K8 Information available to Gas Safe registered operatives:

- Legislative Normative and Informative Document List
- Industry Standard Updates
- Safety Alerts
- Technical Bulletins.

K9 Also have an awareness of the following information available on the HSE website:

- Manual Handling at work
- Work at Height Regulations
- Risk assessment controlling the risks in the workplace
- First aid awareness at work: Safety information and signs
- Fire precautions and actions to be taken in the event of a fire
- Fire safety in construction in HSG 168
- Dangerous Substances Explosive Atmosphere Regulations.

A1.2 GAS EMERGENCY ACTIONS AND PROCEDURES

A1.2.1 Knowledge and Understanding

In relation to emergency actions, you will need to know and understand:

K1 Legislation & standards applicable to this subject area, including IGEM/G/11

K2 Priorities and actions when dealing with gas escapes and/or reported CO incidents including detection equipment

K3 The advice to be given to customers/general public (to include where to find emergency telephone number and how to isolate in the event of a gas escape).

K4 The role of the gas emergency service provider

K5 Properties of Natural Gas.

K6 Responding to low pressure at meter outlets (see IGEM/G/13)

A1.3 PRODUCTS AND CHARACTERISTICS OF COMBUSTION

A1.3.1 Performance Criteria

In relation to complete and incomplete combustion, you will need to be able to:

P1 Identify correct flame pictures

P2 Identify signs of incomplete combustion within and in the locality of an appliance installation

In relation to carbon monoxide (CO) detectors and indicators, you will need to be able to:

P3 Identify, install and commission different types of CO detectors.

A1.3.2 Knowledge and Understanding

In relation to complete and incomplete combustion, you will need to know and understand:

K1 Legislation & standards applicable to this subject area

K2 Characteristics and combustion of gases

K3 Combustion equations for complete and incomplete combustion

K4 Air requirements for complete combustion

K5 Causes of incomplete combustion.

In relation to carbon monoxide (CO) detectors and indicators, you will need to know and understand:

K6 CO poisoning and detection

K7 The different types of CO detectors and their installation requirements

K8 Symptoms of CO poisoning

K9 Sources of CO

K10 Migration of CO.

A1.4 VENTILATION FOR GAS BURNING APPLIANCES

A1.4.1 Performance Criteria

In relation to providing ventilation for gas burning appliances, you will need to be able to:

P1 Measure the free area of a range of different types of air vents and grilles.

P2 Identify correct ventilation provision

P3 Recognition of incorrectly configured ventilation.

A1.4.2 Knowledge and Understanding

In relation to providing ventilation for gas burning appliances, you will need to know and understand:

K1 Legislation & standards applicable to this subject area

K2 Factors affecting ventilation

K3 Design, materials and types of ventilation provision

K4 Calculating ventilation requirements

- Domestic
- Non-domestic (to include but not limited to catering, laundry and heating).

K5 Ventilation labels and notices

K6 Air supply requirements for cooling and combustion

K7 Mechanical ventilation and extraction

K8 Free area and position

K9 Route.

A1.5 INSTALLATION OF PIPEWORK AND FITTINGS

A1.5.1 Performance Criteria

In relation to the installation of pipework and fittings, you will need to be able to:

P1 Join pipework (as appropriate to the types included in the list below) using soldered, threaded, flange, washer, union and mechanical fittings:

a. Copper

b. Steel

c. CSST.

P2 Form copper pipework

P3 De-commission metered gas installations, tee into existing copper pipework and re-commission installation on completion

P4 Demonstrate correct use of a non-contact voltage detector and temporary continuity bond.

A1.5.2 Knowledge and Understanding

In relation to the installation of pipework and fittings, you will need to know and understand:

K1 Legislation & standards applicable to this subject area

K2 Pipework design, installation and maintenance

K3 Copper, mild steel, corrugated stainless steel, medium density Polyethylene pipe and fittings standards, suitability and use

K4 Jointing and cleaning agents for jointing copper and threaded pipework fittings

K5 Restrictions on use of mechanical fittings

K6 Requirements for supporting and clipping gas installation pipework

K7 Pipework protection, firestopping, sleeving and sheathing requirements

K8 Pipe sizing

K9 Identification of Medium pressure fed gas supplies

K10 Hot working and when to use alternative methods

K11 The effects of flux on pipework

K12 Pipework in ducts.

A1.6. TIGHTNESS TESTING AND PURGING

A1.6.1 Performance Criteria

In relation to testing and purging natural gas installations, you will need to be able to:

P1 Test low-pressure gas installations for tightness using air

P2 Test low-pressure gas installations for tightness using gas

P3 Purge low-pressure gas installations

P4 Trace and repair a gas escape

P5 Test existing natural gas installations for tightness with a medium pressure fed gas supply without a meter inlet valve

A1.6.2 Knowledge and Understanding

In relation to testing and purging natural gas installations, you will need to know and understand:

K1 Legislation & standards applicable to this subject area

K2 Tightness testing Standards and limitations

K3 Types of pressure gauge and perceptible movement

K4 Application of permissible pressure loss

K5 Electronic token meter tamper devices

K6 Dealing with let-by

K7 Actions to take when a smell of gas persists after a satisfactory test or after the ECV has been turned off

K8 Calculating installation and purge volumes

K9 Testing before working on an installation.

A1.7 CHECKING AND/OR SETTING METER REGULATORS

A1.7.1 Performance Criteria

In relation to checking meter regulators on natural gas installations, you will need to be able to:

P1 Measure and record the lock-up pressure at the outlet of the regulator

P2 Measure and record the meter outlet operating pressure

P3 Determine if the meter outlet operating pressure is correct or incorrect

P4 Demonstrate adjusting the operating pressure if incorrect

P5 State the actions to take if the operating pressure at the meter outlet is incorrect.

A1.7.2 **Knowledge and Understanding**

In relation to checking meter regulators on natural gas installations, you will need to know and understand:

K1 Legislation & Standards applicable to this subject area

K2 Identification of pressure tiers (i.e., LP, MP, IP, HP).

K3 The effects of low and high flow rates on a meter regulator

K4 The effects of pressure absorption across primary meter installation

K5 The operation of a gas meter regulator

K6 Identification of a medium pressure meter/regulator installation

K7 When and how to check the pressure at the outlet of the ECV.

A1.8 UNSAFE SITUATIONS, EMERGENCY NOTICES AND WARNING LABELS

A1.8.1 **Performance Criteria**

In relation to unsafe situations, emergency notices and warning labels, you will need to be able to:

P1 Identify and classify different categories of unsafe situations

P2 Demonstrate the procedure to follow for each classification of unsafe situation

P3 Complete, explain and issue appropriate warning labels and notices

P4 Identify signs of spillage/leaking products of combustion.

A1.8.2 **Knowledge and Understanding**

In relation to unsafe situations, emergency notices and warning labels, you will need to know and understand:

K1 Legislation & Standards applicable to this subject area

K2 IGEM/G/11 Gas Industry Unsafe Situation Procedure (GIUSP)

K3 Situations reportable under RIDDOR

K4 Situations reportable to Gas Safe Register and/or HSE which are not RIDDOR reportable

K5 Correct use of notices and labels

K6 In relation to re-establishing an existing gas supply and re-lighting the appliances, you will need to know and understand:

a. Actions to take when an un-commissioned appliance is identified.

b. Actions to take if pipework and appliance(s) are not tested (commissioned) when the gas supply is re-established.

A1.9 OPERATION AND POSITIONING OF EMERGENCY ISOLATION CONTROLS AND VALVES

A1.9.1 **Performance Criteria**

In relation to the operation and positioning of emergency control valves, you will need to be able to:

P1 Identify correctly positioned emergency control valves.

P2 Identify the correct labels to attached associated with emergency control valves.

A1.9.2 **Knowledge and Understanding**

In relation to the operation and positioning of emergency control valves, you will need to know and understand:

K1 Legislation & Standards applicable to this subject area

K2 Inside and outside meter positions

K3 Multi-occupancy building installations

K4 Additional emergency control valves

K5 Services into buildings

K6 How to deal with incorrectly positioned emergency control valves

K7 Suitability of valve to be an ECV

K8 Excess flow valves

K9 Thermal cut outs.

A1.10 CHIMNEYS AND FLUES

A1.10.1 Knowledge and Understanding

In relation to chimney/flues you will need to know and understand the requirements for safe operation of the following chimney/flue systems:

K1 Legislation & standards applicable to this subject area

K2 Solid fuel chimneys

K3 Chimneys for individual open-flued natural draught appliances.

K4 Condensing flues

K5 Pre-cast flue systems

K6 Room-sealed natural draught and fanned draught chimney configurations for appliances.

K7 Flues in voids

K8 Non-domestic heating appliance chimney requirements.

K9 Laundry exhaust duct requirements

K10 Catering extract systems

K11 Communal flue systems (CFS)

For all of the chimney systems above, it shall include, where appropriate:

K12 Materials, construction and route

K13 Securing and supporting

K14 Termination & terminal guards

K15 Plume management

K16 Safety devices (interlocks).

A1.11 RE-ESTABLISH EXISTING GAS SUPPLY AND RE-LIGHT APPLIANCES

A1.11.1 Performance Criteria

In relation to re-establishing an existing gas supply and re-lighting the appliances, you will need to be able to:

P1 Check the installation is gas tight

P2 Purge the installation and appliances of air

P3 Establish a stable flame (where visible) on each appliance

P4 Visually inspect each appliance and identify any unsafe situations in accordance with IGEM/G/11

P5 Confirm satisfactory operation of user controls.

A1.11.2 Knowledge and Understanding

In relation to re-establishing an existing gas supply and re-lighting the appliances, you will need to know and understand:

K1 Actions to take when an un-commissioned appliance/plant is identified

K2 Actions to take if pipework and appliance(s)/plant are not tested (commissioned) when the gas supply is re-established

K3 Actions to take when installing a meter with no appliances connected.

APPENDIX 2: OFF-SITE TRAINING (METER/TESTING/ESP SPECIFICS) SPECIFIC TRAINING FOR METERING INSTALLATION TYPES

The minimum guided learning hours assigned to each subject are detailed below:

METERING / ESP OPTIONAL COMPETENCIES (AT LEAST ONE UNIT MUST BE SELECTED) **Note:** Dealing with reported gas emergencies is mandatory for ESP candidates	OVERVIEW	ACS COMPETENCIES	MINIMUM GUIDED LEARNING HOURS
Low-Pressure & (Medium Pressure) Gas Meters and Regulators	U6 / G4 6 m^3/h	MET1 + (REGT1)	6.5
Low-Pressure Diaphragm Gas Meters	≤40 m^3/h	MET4	6.5
Dealing with Reported Gas Emergencies			13
Tightness Testing and Purging to IGE/UP/1A	volume ≤ 1 m^3 MOP ≤ 75 mbar	TPCP1A	19.5
Tightness Testing and Purging to IGE/UP/1	MOP ≤ 16 bar	TPCP1	26

TABLE 2 - MINIMUM GUIDED LEARNING HOURS FOR METERING/ESP OPTIONAL COMPETENCIES

A2.1 GAS METERS AND REGULATORS ≤ 6 m^3/h

A2.1.1 Performance Criteria

In relation to gas meters and regulators you will need to be able to:

P1 Install a gas meter and regulator in the following locations:
- Internal Installation
- Surface or Built-in Meter Box
- Semi-Concealed Meter Box.

P2 Commission a meter installation incorporating a low-pressure regulator

P3 Commission a meter installation incorporating a medium-pressure regulator

P4 Exchange meter

P5 De-commission and permanently remove a meter installation.

A2.1.2 Knowledge and Understanding

In relation to gas meters and regulators you will need to know and understand:

K1 Legislations and Standards applicable to the subject area including approvals required from Meter Equipment Managers

K2 Design considerations when installing a meter, including meter capacity

K3 Gas Safety Regulations applying to meters and regulators

K4 Safety notices and labels

K5 Construction and operation of MP regulators

K6 Regulator set point and lock-up pressure on MP regulator where an additional LP regulator is installed

K7 Pressure at which relief valve will operate on MP regulator

K8 Pressure at which slam-shut will operate

K9 Installing LP and MP meters in enclosures/housings including pipework exit routes and relief termination

K10 Siting of MP meter housings and relief vent tips

K11 Sealing meter regulators

K12 Requirements for a number of primary meters grouped together and serving a multi-occupancy building including but not limited to:

- Recognition that DSEAR applies to rooms/enclosures containing meter banks
- Ventilation requirements
- Meter labels.

K13 Criteria for installation of secondary meters

K14 Terms and acronyms

K15 Electrical bonding for meter installations

K16 Commissioning requirements including:

- New meter installation without downstream pipework or appliances
- New meter installation with downstream pipework, but no appliances
- New meter installation where downstream pipework and appliances are installed and uncommissioned
- Meter exchange.

K17 Meter types and design

K18 Meter box and enclosures

K19 Safety notices and labels

K20 Suitable meter locations

K21 Meter installations.

A2.2 LOW-PRESSURE DIAPHRAGM GAS METERS (U16-U40)

A2.2.1 Performance Criteria

In relation to low-pressure diaphragm gas meters, you will need to be able to:

P1 Install a diaphragm meter of badged capacity > 6 m^3/h ≤ 40 m^3/h

P2 Commission a diaphragm meter of badged capacity > 6 m^3/h ≤ 40 m^3/h

P3 Exchange diaphragm meter > 6 m^3/h ≤ 40 m^3/h

P4 De-commission and permanent removal of diaphragm meter installation > 6 m^3/h ≤ 40 m^3/h.

A2.2.2 Knowledge and Understanding

In relation to low-pressure diaphragm gas meters, you will need to know and understand:

K1 Design considerations prior to installing a meter, including meter capacity and line diagrams

K2 Application of meter installation components including flexible connections, regulators, filters and valves

K3 ECV, MIV and AECV when meter is installed remotely from buildings

K4 Requirements for a number of primary meters grouped together

K5 Criteria for installation of secondary meters

K6 Calculate installation and purge volumes of an installation with diaphragm meter of badged capacity > 6 m^3/h ≤ 40 m^3/h and pipework fitted

K7 Commissioning requirements for diaphragm meters > 6 m^3/h ≤ 40 m^3/h including:

- New meter installation without downstream pipework or appliances
- New meter installation with downstream pipework, but no appliances
- New meter installation where downstream pipework and appliances are installed and uncommissioned
- Meter exchange.

K8 Safety notices and labels
K9 Electrical bonding for meter installations.
K10 Meter types and design
K11 Meter box and enclosures
K12 Safety notices and labels
K13 Suitable meter locations
K14 Meter installations.

A2.3 DEALING WITH REPORTED GAS EMERGENCIES

A2.3.1 Performance Criteria

In relation to dealing with reported emergencies you will need to be able to:

P1 Actions required to safeguard life and property:
- Personal safety (is assistance required) and PPE
- Customer/public safety
- Evacuation criteria
- Sources of ignition
- Ventilation.

P2 Investigate the likely source and severity of the reported emergency:
- Downstream gas escapes
- Upstream gas escapes
- Products of Combustion, including CO
- Migration
- No trace (Other sources).

P3 Identify and disconnect an unsafe appliance:
- Downstream gas escape (trace and repair/make safe)
- Upstream gas escape (trace and program repair).

P4 Actions required for dealing with suspected escape of products of combustion:
- Responding to CO alarm activation
- Potential source within the property
- Potential migration
- Evacuation criteria.

P5 Records and reporting:
- RIDDOR
- Unsafe situations/labelling
- Job reports.

A2.3.2 Knowledge and Understanding

In relation to dealing with reported emergencies you will need to know and understand:

K1 Legislations and Standards applicable to the subject area
K2 Protecting evidence of a potential incident
K3 The safety precautions required when responding to a reported gas escape:
- Sources of ignition
- Flammability limits
- Action levels and procedures.

K4 The safety precautions required when responding to a reported CO incident:
- Action levels and procedures.

K5 Migration of gas/products of combustion

K6 Actions required where downstream gas supply is gas tight, but there is a smell of gas

K7 Gas detection and personal safety equipment.

A2.4 TIGHTNESS TESTING AND PURGING TO IGE/UP/1A

A2.4.1 Performance Criteria

In relation to tightness testing and direct purging of small, low-pressure natural gas non-domestic gas installations, you will need to be able to:

P1 Prepare for pneumatic strength testing – new installation and extensions (air or nitrogen)

P2 Carry out pneumatic strength test – new installation and extensions (air or nitrogen)

P3 Prepare for tightness testing – existing installations (gas)

P4 Carry out tightness test – existing installations (gas)

P5 Carry out tightness test immediately following strength test on new installations (air or nitrogen)

P6 Prepare for direct purging

P7 Determine purge volume, purge flow rate and purge time

P8 Direct purging - venting to outside - from air to gas (commissioning)

P9 Direct purging from gas to air (de-commissioning).

A2.4.2 Knowledge and Understanding

In relation to tightness testing and direct purging of small, low-pressure natural gas non-domestic gas installations you will need to know and understand:

K1 Acronyms and symbols

K2 Determination of maximum operating pressure (MOP) and maximum incidental pressure (MIP)

K3 Identifying volumes of differing meter types

K4 Procedure where it is not possible to calculate installation volume or estimate with any confidence

K5 By-passing system components during tightness test

K6 Effects of variations of temperature and atmospheric pressure

K7 Terms and acronyms applying to non-domestic medium pressure regulators

K8 Requirements for hazardous areas surrounding meter installation fittings and components

K9 Safety and environmental requirements to be considered prior to purging

K10 Procedures to adopt when purging into an internal area

K11 Purging branched pipework

K12 Purging replacement meters

K13 Purging procedures for taking pipework out of service

K14 Purging with air through compressed air cylinders

K15 Planning and procedures for carrying out a purge

K16 Procedures when required flow rate of purge is not achieved

K17 Identification of purge gas cylinders used to carry out purge.

A2.5 STRENGTH, TIGHTNESS TESTING AND PURGING TO IGE/UP/1

A2.5.1 Performance Criteria

In relation to strength, tightness testing and purging of natural gas non-domestic gas installations you will need to be able to:

P1 Prepare for pneumatic strength testing – new installation and extensions (air or nitrogen)

P2 Carry out pneumatic strength test – new installation and extensions (air or nitrogen)

P3 Carry out tightness test immediately following strength test on new installations (air or nitrogen)

P4 Prepare for tightness testing – existing installations (fuel)

P5 Carry out tightness test – existing installations (fuel)

P6 Prepare for a commission purge

P7 Determine purge volume, purge flow rate and purge time

P8 Undertake purge - venting to outside - from air to fuel (commissioning)

P9 Undertake purge from fuel to air (de-commissioning).

A2.5.2 Knowledge and Understanding

In relation to tightness testing and direct purging of small, low-pressure natural gas non-domestic gas installations you will need to know and understand:

K1 Acronyms and symbols

K2 Determination of maximum operating pressure (MOP) and maximum incidental pressure (MIP)

K3 Calculation of strength test pressure (STP) and strength test duration (STD)

K4 Requirement to remove components that cannot withstand the STP

K5 When to undertake strength test, tightness test and commission or de-commission purge

K6 Identifying volumes of differing meter types

K7 Method of calculating new tightness test duration (TTD) with consideration to installation volume, gauge type and test medium

K8 Method of calculating existing tightness test duration (TTD) with consideration to installation volume, gauge type, pipework area and test medium

K9 Procedure where it is not possible to calculate installation volume or estimate with any confidence

K10 By-passing system components during tightness test

K11 Effects of variations of temperature and atmospheric pressure

K12 Calculation of purge volumes, minimum purge flow rates and maximum purge times for an installation

K13 Determination of commission and de-commission and safe end point gas readings

K14 Correct size, configuration and positioning of purge equipment

K15 Safety and environmental requirements to be considered prior to purging and the potential for undertaking a flare-off

K16 When it will be acceptable and the procedures to adopt when purging into an internal area

K17 Purging replacement meters

K18 Purging procedures for taking pipework out of service

K19 Purging with air using either air blower or compressed air cylinders

K20 Procedures when required flow rate of purge is not achieved

K21 Identification of purge gas cylinders used to carry out purge.

APPENDIX 3: ON-SITE REQUIREMENTS

This Appendix outlines the on-site requirements that are to be assessed through performance. Evidence is gathered through activities carried out by the New Entrant (under the observation of a Mentor) for a customer at their premises.

COLOUR CODE	DESCRIPTION	CODES FOR ASSESSMENT
Green	**Directly observed**	**DOS** – Directly observed real life activity onsite **DOC** – Directly observed simulated realistic activity in centre
Orange	**Observation on-site with a mentor**	**RAS** – Reflective Account Site - from site with supporting evidence. Suggest that this is the preferred option for MLP portfolios **RAC** – Reflective Account Centre - from simulated centre with supporting evidence

TABLE 3 – ASSESSMENT CODES

A3.1 CORE ON-SITE EVIDENCE REQUIREMENTS

INSTALLATION OF GAS PIPEWORK (≤ 35 mm)			
New entrants are to be observed on the minimum amount of occasions and range as identified below			
The candidate has covered necessary training required prior to the observation			
Mentor signature		Date	
Candidate signature		Date	

Observation Requirements	
Total - 5 assessments install gas pipework	
Assessment 1	**Directly Observed** May be DO in centre
Observation 2	**Reflective Account** From site
Observation 3	**Reflective Account** From site
Observation 4	**Reflective Account** From site
Observation 5	**Reflective Account** From site

Installation to include

- New or replacement pipework
- Associated pipework fixings and joints.

Range – Pipe material from the following list • Copper tube * • Steel tube • Corrugated stainless-steel tube (CSST). * Must be covered	**Secondary Range** – Jointing methods from the following list • Capillary joints * • Compression joints • CSST joints • Press fit • Screwed joints. * Must be covered

GAS TIGHTNESS TESTING, DIRECT PURGING (IGE/UP/1B) AND RELIGHTING APPLIANCES			
New entrants are to be observed on the minimum amount of occasions and range as identified below.			
The candidate has covered necessary training/mentoring required prior to the observation			
Mentor signature		Date	
Candidate signature		Date	

Observation Requirements	
Total - 5 observations - Tightness testing, purging and relighting of gas installations and appliances	
Assessment 1	**Directly Observed** May be DO in centre
Observation 2	**Reflective Account** From site
Observation 3	**Reflective Account** From site
Observation 4	**Reflective Account** From site
Observation 5	**Reflective Account** From site

Observation to include

- Tightness test
- Purge
- Relight appliances.

A3.2 **OPTIONAL ON-SITE EVIDENCE REQUIREMENTS (EVIDENCE TO BE COMPLETED FOR EACH OF THE COMPETENCIES INCLUDED WITHIN THE PROGRAMME)**

INSTALLATION/ EXCHANGE OF GAS METERS AND REGULATORS (≤ 6 m^3/h) (MET1)			
New entrants shall be observed on the minimum amount of occasions and range as identified below			
The candidate has covered necessary training required prior to the observation			
Mentor signature:		Date	
Candidate signature		Date	

Observation Requirements	
Total - 10 observations (5 required for ESP) - Installation/exchange of a gas meter For candidates following the ESP routes, all evidence can be simulated in centre.	
Assessment 1	**Directly Observed** May be DO in centre
Observation 2	**Reflective Account** From site
Observation 3	**Reflective Account** From site
Observation 4	**Reflective Account** From site
Observation 5	**Reflective Account** From site
Observation 6	**Reflective Account** From site
Observation 7	**Reflective Account** From site
Observation 8	**Reflective Account** From site
Observation 9	**Reflective Account** From site
Observation 10	**Reflective Account** From site

Observation to include

- New or replacement meter
- Associated pipework connections
- Commission, handover and completion of relevant documentation.

Range –all of the following

- Internal installation
- Surface or built-in meter box
- Semi-concealed meter box.

PREPARE, INSTALL AND COMMISSION MEDIUM PRESSURE GAS METER AND REGULATOR (Natural Gas Meter ≤ 6 m^3/h with MOP_u > 75 mbar ≤ 2 bar) (REGT1)			
New entrants shall be observed on the minimum amount of occasions and range as identified below. For candidates following the ESP routes, all evidence can be simulated in centre.			
The candidate has covered necessary training required prior to the observation			
Mentor signature		Date	
Candidate signature		Date	

Observation Requirements	
Total - 5 observations - **Prepare, install and commission medium pressure gas meter and regulator**	
Assessment 1	**Directly Observed** May be DO in centre
Observation 2	**Reflective Account** From site
Observation 3	**Reflective Account** From site
Observation 4	**Reflective Account** From site
Observation 5	**Reflective Account** From site

Observation to include

- Natural Gas installations
- Tightness test
- Purge
- Completion of associated documentation.

- **Range** – at least two out of the following regulator incorporating a slam-shut valve (SSV) (PRS 28/E)
- Regulator incorporating a metering installation excess flow valve (MIEFV) (PRS 29/E)
- Surface or built-in meter box
- Semi-concealed meter box
- New installation
- Installation exchange (existing installation with no meter inlet valve (MIV)).

INSTALL GAS METERS AND REGULATORS (> 6 m^3/h ≤ 40 m^3/h) (MET4)			
New entrants shall be observed on the minimum amount of occasions and range as identified below			
The candidate has covered necessary training required prior to the observation			
Mentor signature		Date	
Candidate signature		Date	

Observation Requirements

Total - 5 Observations- Installation of a gas meter and regulators

For candidates following the ESP routes, all evidence can be simulated in centre.

Assessment 1	**Directly Observed** May be DO in centre
Observation 2	**Reflective Account** From site
Observation 3	**Reflective Account** From site
Observation 4	**Reflective Account** From site
Observation 5	**Reflective Account** From site

Observation to include

- New or replacement meter
- Associated pipework connections
- Commission, handover and completion of relevant documentation.

Range 1 – at least two from the following • Diaphragm meter U16, U25, U40.	**Range 2** – to include the following • Internal installation • Meter kiosk.

DEALING WITH REPORTED GAS EMERGENCIES (N/A for metering candidates, optional for ESP candidates)			
New entrants shall be observed on the minimum amount of occasions and range as identified below.			
The candidate has covered necessary training required prior to the observation			
Mentor signature		Date	
Candidate signature		Date	
Observation Requirements			
Total - 10 assessments - **Dealing with reported gas emergencies**			
Observation 1	**Reflective Account** From site		
Observation 2	**Reflective Account** From site		
Observation 3	**Reflective Account** From site		
Observation 4	**Reflective Account** From site		
Observation 5	**Reflective Account** From site		
Observation 6	**Reflective Account** From site		
Observation 7	**Reflective Account** From site		
Observation 8	**Reflective Account** From site		
Observation 9	**Reflective Account** From site		
Observation 10	**Reflective Account** From site		
Observation to include • Dealing with reported gas emergencies.			

Range 1 – at least two of the following	**Range 2** – at least two of the following
• Gas distribution assets • Low-pressure leakage • Medium-pressure leakage • Non-domestic premises • Domestic premises • Confined spaces. • Meter and regulator • Internal appliances.	• Site survey • Risk assessment • Evacuation and reoccupation • No Access/forced entry • Reported poor pressure • Detection methods • Concentration readings • Water ingress to assets • No trace • Third party liaison/ verbal communication/ documented reporting. • Controlled • Uncontrolled • No gas • Reports of fumes • Gas ingress to premises.

STRENGTH TESTING, TIGHTNESS TESTING AND DIRECT PURGING (IGE/UP/1)			
New entrants shall be observed on the minimum amount of occasions and range as identified below For candidates following the ESP routes, all evidence can be simulated in centre.			
The candidate has covered necessary training required prior to the observation			
Mentor signature		Date	
Candidate signature		Date	
Observation Requirements			
Total - 5 observations - **Strength testing, tightness testing and direct purging** (IGE/UP/1A)			
Assessment 1	**Directly Observed** May be DO in centre		
Observation 2	**Reflective Account** From site		
Observation 3	**Reflective Account** From site		
Observation 4	**Reflective Account** From site		
Observation 5	**Reflective Account** From site		
Assessment to include • Strength test • Tightness test and purge • Completion of associated documentation.			
Range 1 – cover at least three of the following • Strength test • Tightness test • Commissioning purge • Decommissioning purge.		**Range** 2 – cover at least two of the following • Meter installation only • Meter installation and downstream pipework • Downstream pipework only.	

STRENGTH TESTING, TIGHTNESS TESTING AND DIRECT PURGING (IGE/UP/1A)			
New entrants shall be observed on the minimum amount of occasions and range as identified below For candidates following the ESP routes, all evidence can be simulated in centre.			
The candidate has covered necessary training required prior to the observation			
Mentor signature		Date	
Candidate signature		Date	

Observation Requirements

Total - 5 observations - **Strength testing, tightness testing and direct purging** (IGE/UP/1A)

Assessment 1	**Directly Observed** May be DO in centre
Observation 2	**Reflective Account** From site
Observation 3	**Reflective Account** From site
Observation 4	**Reflective Account** From site
Observation 5	**Reflective Account** From site

Assessment to include

- Strength test
- Tightness test and purge
- Completion of associated documentation.

Range 1 – cover at least three of the following • Strength test • Tightness test • Commissioning purge • Decommissioning purge.	**Range** 2 – cover at least two of the following • Meter installation only • Meter installation and downstream pipework • Downstream pipework only.

APPENDIX 4: EQUIPMENT LIST

A4.1 CORE REQUIREMENTS

SAFETY, LEGISLATION AND STANDARDS
A selection of power tools and electrical equipment

PRODUCTS AND CHARACTERISTICS OF COMBUSTION
A selection of gas appliances and equipment with a variety of burners at least one to be showing signs of incomplete combustion
Installed open-flued, room-sealed, and flueless appliance with MIs. A selection of CO detectors

VENTILATION FOR DOMESTIC GAS BURNING APPLIANCES
A selection of air grilles and air bricks (including terracotta) Air vent probe.
A selection of installed ventilation air grilles and bricks with appliances installed (for candidates to calculate ventilation requirements)

INSTALLATION OF PIPEWORK AND FITTINGS
A selection of copper fittings
Copper pipe
Bending machine (for copper)
Mild steel pipework and taper threaded fittings
CSST fittings and pipework
Mechanical fittings including, compression, threaded, flange, washer and union types
Flexible connectors including meter connections and cooking appliances
Temporary continuity bond
A non-contact voltage detector
A 'live' metered gas installation including Equipotential Bonding

TIGHTNESS TESTING AND PURGING
A domestic LP gas installation and appliance for tightness testing and purging
An MP fed gas supply (test rig) with a meter inlet valve
An installation with a gas escape for the candidate to trace and repair

CHECKING AND/OR SETTING METER REGULATORS
A live installation including a gas meter and pipework connected to at least 2 appliances

UNSAFE SITUATIONS, EMERGENCY NOTICES AND WARNING LABELS
A selection of ID appliances and installations including: Signs of spillage / leaking products of combustion Gas escape.
A selection of AR appliances and installations including: Chimney defects.
A selection of warning labels and notices

RE-ESTABLISH EXISTING GAS SUPPLY AND RE-LIGHT APPLIANCES
A selection of bays with a live installation including a gas meter and pipework connected to at least 2 appliances with MIs. Appliances to include:
Cooking appliance
Open-flued boiler
Room-sealed boiler
Small commercial appliance
Open-flued gas fire

A4.2 **OPTIONAL UNITS**

LOW-PRESSURE & (MEDIUM-PRESSURE) GAS METERS AND REGULATORS
A low-pressure gas meter installation ≤6m³/h
A medium-pressure gas meter installation (or test rig) with MIV
A selection of gas meters, regulators, interconnecting pipework & fittings, semi-rigid connections, meter unions, meter washers, meter brackets and meter boxes.
A low-pressure gas supply with main equipotential bonding fitted.

NON-DOMESTIC LOW-PRESSURE DIAPHRAGM GAS METERS
A diaphragm meter of badged capacity > 6 m³/h ≤ 40 m³/h

TIGHTNESS TESTING AND PURGING TO IGE/UP/1A AND IGE/UP/1
A range of test equipment is required as per the standards mentioned

APPENDIX 5: FURTHER GUIDANCE

Guidance for the new entrant, the training organisation and the recogniser of training is to be provided and as a minimum shall include:

- Education requirements for new entrants
  Applicants will normally have gained a minimum of 2 GCSEs (grade C) or equivalent, preferably English, mathematics or relevant/appropriate experience or an entry assessment
- Information for the new entrant about the opportunities in the industry following successful completion of the training
- Responsibilities of the training organisation
- Responsibilities of the new entrant
- Transfer of training to other recognised training organisations
  In the event of the training organisation being unable to provide the remaining training, or the learner advocates to use another training organisation part way through the programme, for example has relocated to another part of the UK, the transfer of training is allowed.

APPENDIX 6: REFERENCES, GLOSSARY, ACRONYMS AND DEFINITIONS

A6.1 REFERENCES

This Specification is set out against a background of Legislation in force in GB at the time of publication. The devolution of power to the Scottish, Welsh and Northern Ireland Assemblies means that there may be variations to the Legislation described below for each of them and consideration of their particular requirements must be made. Similar considerations are likely to apply in other countries and reference to appropriate national Legislation will be necessary.

Care is to be taken to ensure that the latest editions of the relevant documents are used.

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

A6.1.1 Primary legislation

- Health and Safety at Work etc. Act 1974 (HSWA).

A6.1.2 Secondary legislation

- Gas Safety (Installation and Use) Regulations 1998 as amended (GS(I&U)R)
- Provision and Use of Work Equipment Regulations 1998 (PUWER)
- Electricity at Work Regulations 1989
- Work at Height Regulations 2005 as amended
- Building Regulations 2010 as amended
- Control of Substances Hazardous to Health 2002 as amended (COSHH)
- Manual Handling Operations Regulations 1992.

A6.1.3 HSE ACoPs and guidance

- HSE L56 Safety in the Installation and Use of Gas Systems and Appliances - Approved Code of Practice (ACoP)
- HSG 168 Fire safety in construction.

A6.1.4 IGEM Standards and guidance

- IGEM/G/0 Edition 2 — A Standard for IGEM Standards
- IGEM/IG/1 Edition 2 — Standards of training in gas work
- IGEM/G/4 Edition 2 — Definitions for the gas industry
- IGEM/GM/6 Edition 3 — Non-domestic meter installations. Standard designs
- IGEM/G/11 Edition 2 — Gas Industry Unsafe Situations Procedure
- IGEM/G/11 Supplement 1 — Responding to domestic CO alarm activations/reports of fumes after attendance by the emergency service provider or the Liquefied Petroleum Gas supplier
- IGEM/UP/1B Edition 3 — Tightness testing and direct purging of small Liquefied Petroleum Gas/Air, Natural Gas and Liquefied Petroleum Gas installation.

A6.1.5 SMB guidance

- GN8 ACS Guidance Note 8.

A6.1.6 **British Standards**

- BS 6400-1 - 2016 Specification for installation, exchange, relocation, maintenance and removal of gas meters with a maximum capacity not exceeding 6 m³/h. Low pressure (2nd family gases)
- BS 6400-2 - 2018 Specification for installation, exchange, relocation, maintenance and removal of gas meters with a maximum capacity not exceeding 6 m³/h. Medium pressure (2nd family gases).

A6.2 **GLOSSARY**

All definitions are given in IGEM/G/4 which is freely available by downloading a printable version from IGEM's website, www.igem.org.uk.

The definitions listed below are relevant to the use of this Standard.

Recommended and legacy gas metering arrangements are given in IGEM/G/1 which is freely available by downloading a printable version from IGEM's website, www.igem.org.uk.

DEFINITIONS

class of persons	all gas engineering businesses, including self-employed gas engineers, are (subject to the limited exceptions in regulation 3(4)) required to be in membership of a class of persons approved by HSE, whether they carry out such work as their main or part activity. Gas engineers who are employed by a member of an approved class of persons but who do separate work on their own behalf need to be in membership of such class of persons, e.g., Gas Safe registered. This definition is an extract from GS(I&U)R.
competence	the combination of skills, knowledge and understanding to perform consistently to current recognised Standards.
domestic utilisation sector	those premises containing gas installations which are downstream of the Natural Gas Network or LPG installation emergency control valve other than non-domestic premises.
industry recognised	the Standards Setting Body is required to recognise all training for developers/providers wishing to provide training for new entrants working under the GS(I&U)R and for training providers wishing to become recognised to offer training for those working outside the scope of GS(I&U)R.
learner	a person (new entrant) learning a subject or skill
mentor	a technically competent, Gas Safe registered person with suitable industry experience, holding relevant competencies, who provides on-site support and advice to the new entrant whilst building evidence for their portfolio, during the programme duration.
mentoring	a person(s) with the appropriate knowledge and experience supporting the new entrant in their training.
new entrant	a person who does not hold relevant gas qualifications, has not received recognised training and wishes to achieve a recognised industry qualification, see IGEM/IG/1.
`Off-site' training	training that is undertaken in a classroom or workshop (which may be indoor or outdoor).

`On-site' training	training that is undertaken for a customer at the learner's place of work (it may be simulated in a workshop under certain limited conditions).
portfolio	a collection of records which will be written, copies of documents, reports or test papers and photographs that is evidence of the work experience and/or work that the new entrant has undertaken.
Standards Setting Body	approved by HSE to develop and maintain the gas safety competence criteria for the proof of competence that leads to Gas Safe registration. The body currently performing these duties is E&US.
Standards Consultation Forum	ensures that employers and stakeholders allied to the gas industry are appropriately consulted as an integral part of the process of competence standard setting arising from proposals to amend or introduce new assessment mechanisms and associated aspects for businesses seeking registration on the Gas Safe Register. For membership details contact E&US.
Strategic Management Board	ensures that the mechanisms and processes established for the production, maintenance and implementation of competence criteria and associated assessment specifications, operate in an effective and efficient manner to align fully with the Legislative requirements of the Gas Safety (Installation and Use) Regulations 1998 and subsequent registration requirements for consumer safety. For details, contact E&US.
trainer	a technically competent person, who delivers off-site training to the required training specification. A trainer shall be suitably qualified and experienced and hold relevant vocational and/or ACS qualifications/accreditations for the subject delivery. It is expected that trainers have been actively involved in gas installation and maintenance work and it is desirable for trainers to have had at least 5 years of post-qualification experience. New and inexperienced trainers are permitted to be involved with the programme provided they are closely monitored and supported in their development.

A6.3 ACRONYMS AND ABBREVIATIONS

ACoP	Approved Code of Practice
ACS	Nationally Accredited Certification Scheme for Individual Gas Fitting Operatives
AR	At Risk
CFS	communal flue system
CSST	corrugated stainless steel tubing
CO	carbon monoxide
CO_2	carbon dioxide
COSHH	control of substances hazardous to health
DO	directly observed
DOC	directly observed simulated realistic activity in centre
ECV	emergency control valve
E&US	Energy and Utility Skills
FSD	flame supervision device
GB	Great Britain
GCSE	General Certificate of Secondary Education
GN8	Guidance Note 8
GS(I&U)R	Gas Safety (Installation and Use) Regulations
HSE	Health and Safety Executive
ID	Immediately Dangerous
IGEM	Institution of Gas Engineers and Managers
LP	low pressure
LPG	Liquefied Petroleum Gas
MI	manufacturer's instructions
MP	medium pressure

PUWER	Provision and Use of Work Equipment Regulations
RAC	reflective account centre
RAS	reflective account site
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
SCF	Standards Consultation Forum
SMB	Strategic Management Board.

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