

FINAL DOCUMENT

Recommendations on Safety of Domestic Gas Installations

EXECUTIVE SUMMARY

This paper considers the impacts of the liberalization of the gas and services market in Europe and the need to reduce potential barriers to trade whilst seeking to establish the development of mutually recognised standards covering installation, inspection and maintenance of downstream gas installations through a competence assessment scheme or integrated process for gas operatives and companies engaged in the sector. Consideration is given to existing arrangements on competence requirements for movement between states and the needs of the Designated Authority in Host States.

The paper deals with domestic (residential) installations only, covering requirements for pipework, chimneys and appliances. It does not address metering or non-domestic (industrial and commercial) installations. Metering installation requirements need to be examined separately, however, adequate controls are likely to exist in all Member States as a result of requirements for ownership of meters and the relationship with gas accounting processes for customers. A separate paper will be produced to consider Non Domestic (commercial and industrial) installations.

The primary consideration within the paper is the establishment of an acceptable level of safety for gas installations and addresses the quality of work and the competence requirements for operatives, particularly installers.

The quality and safety of the gas installations are generally assured through competent operatives complying with technical regulations, inspection and maintenance regimes, independent safety inspection of work undertaken and assuring competence of installers and inspectors. The paper recognises the considerable variation with regards to the manner in which these means are provided for by consideration of each aspect in detail.

Whilst new appliances must comply with the GAD and be CE marked, it is recognized that there are different gas qualities delivered to domestic users within the European community. There is a need for the designer / operative to be aware of the implications of differing gas quality and the need to verify the fitness for purpose and the compatibility with the supplied gas for any new appliance installation.

Maintenance of appliances is considered as an important area in order to ensure safety, efficiency and environmental conditions in accordance with appliance manufacturers' instructions. The specific national requirements for periodic inspection for gas installations or for particular social or consumer sectors may vary across the member states and therefore the installer / engineer should have the knowledge, competence and skills for adequate maintenance and inspection of the installation.

In addition, consideration is given to the potential for individual Member States having differing requirements for independent inspection of gas installation work and gain compliance with national requirements through notification to a designated authority or by a process of self certification. It is recognised that any operative working in this sector needs to be aware of the existence of any such regimes within the Host Nation.

Many of the above aspects are encompassed with specific legal obligations and specific industry standards applicable in the Host Nation. The need for the operative to have an underpinning knowledge and understanding of such requirements is essential. Consideration of the possibility that such requirements may not be in the language of the operatives country of origin is an important factor.

Whilst all Member States have general requirements covering the need for operatives to be appropriately competent to carry out work in a safe manner, the way this is dealt with does vary and therefore there is a need to achieve a consistent approach to this key requirement.

INTRODUCTION

As a result of the liberalization of the gas and services market in Europe and the need to reduce potential barriers to trade, Marcogaz Standing Committee Gas Utilisation has considered whether there is benefit in the development of mutually recognized standards, covering installation, inspection and maintenance of pipework and appliances downstream of the point of delivery, including the development of a competence assessment scheme for gas operatives and companies engaged in this sector.

GCI-UICP is committed to guaranteeing highest possible safety levels for domestic gas installations through compulsory qualification / certification requirements for host operatives and regular safety checks. Based on shared goals in this area, GCI-UICP decided to join the action initiated by Marcogaz standing committee Gas Utilisation

Member States will have their own existing arrangements for assessing the competence of host operatives. Although there may be benefits in developing arrangements so that there can be movement of labour without unnecessary barriers, it is important to respect existing national requirements which have resulted from experience, deliberations and negotiations in Member States.

However, to assist and facilitate the movement of operatives between states a mutual recognition framework/matrix that is agreed by all Member States will be required. This should be designed and developed to help Member States and those operatives wishing to relocate, to be able to benchmark their respective knowledge, experience and qualifications against the requirements of the Host State for particular categories of work. In particular, the mutual recognition framework is described in the recommendations at the end of this document.

The objectives of reducing complexity and ensuring free movement of labour would need to be able to deal effectively with the following scenarios:

- a) Movement of individual operatives between Member States:
 - Acting as a sole-trader
 - Working for an established business in the host country
 - Applying for training in a host country
 - Applying for employment before migrating to a host country
 - Following their existing employer into an existing contract in a host country
 - Applying for employment with a new host country business venture
- b) Movement of businesses between Member States
 - Bidding for a new contract within the host country
 - In order to set up in a host country

2. BACKGROUND

In order to ensure an acceptable level of safety for gas installations regarding the protection of life and property, it is important to address the following 3 main factors, which have an influence on gas safety in general:

- a) The quality and safety of components and gas appliances

This can be assured by third party certification, based on type-examination and type-testing for conformity with product standards. The Gas Appliance Directive is a guarantee for this assurance based on a harmonised European approach and therefore need not be considered in this document.

- b) The quality of the work when gas installations are constructed and the service work of installations and gas appliances.

This position paper proposes a framework for assuring the quality of gas installations, appliances and service work. Potential ways in which individual competence of operatives and/or businesses can be assured and mutually recognised between Member States are considered.

- c) The behaviour of users and/or owners towards use and maintenance of installations and gas appliances. They also bear legal responsibility for ensuring that gas installations and appliances are used and maintained such that safety is assured.

The means of assuring responsible behaviour of consumers is not covered in this document

3. ASSURING THE QUALITY OF INSTALLATION AND SERVICE WORK

Domestic gas installations offer safe, efficient and user-friendly comfort to end-users provided they are designed and installed by competent operatives, together with adequate maintenance and regular inspection.

The general requirements for competence are dealt with in section 7.

In order to assure quality and safety of gas installations the following elements must be considered:

- Technical regulations for pipe work
- Technical regulations for appliance installations.
- Prescriptions for inspection and maintenance of installations and appliances.
- Prescriptions for third party safety inspection* of new and existing installations.
- Assuring competence of operatives and inspectors.

*Note: Safety Inspection will often be incorporated into a maintenance specification, but may be offered as a separate service, which can be compulsory, in the interests of assuring adequate safety performance of an appliance/installation at an economic cost. Definitions of Inspection and Maintenance are proposed in Section 6 of this document.

There is considerable variation, across Member States, with regards to the manner in which these elements are provided for. Each of these elements are considered, in order to provide a basis for a European best practice for minimum safety requirements.

Technical standards may be complemented by more detailed national standards, which should be applied in association with EN standards, but will not conflict with them. There may also be additional requirements in national legislation / regulations, particularly those relating to the construction of services within buildings, which shall take precedence

4. TECHNICAL REGULATIONS FOR PIPE WORK

This section deals with the achievement of a consistent basis for the safe and efficient installation of gas pipework in domestic premises. The following Standard applies:

EN 1775 Gas supply – Gas pipework for buildings – Maximum operating pressure up to and including 5 bar – Functional recommendations, covers principles of gas supply systems..

A1 - additional recommendations for commercial, public access and high-rise buildings and on welded, brazed, soldered and polyethylene fusion joints.

A2 - supplement to the scope.

This functional standard specifies the common appropriate principles and the recognised practices concerning:

- Design
- Installation & Construction

- Testing
- Commissioning
- Operation and Maintenance
- Working on Operating Pipe

It is intended to be applied by competent persons who have suitable knowledge, experience and approval.

The standard is for pipework between the point of delivery of the gas and the inlet connection to the gas appliances. It applies to new installation pipework, and replacement of, or extensions to, existing pipework. It does not cover buried pipework (prEN 15001 Part1 & 2), gas metering systems (prEN 1776), LPG storage vessels or LPG installations supplied directly from storage vessels.

5. TECHNICAL REGULATIONS FOR APPLIANCE INSTALLATIONS

5.1. Introduction

This section deals with the achievement of a consistent basis for the sustainable, safe and efficient installation of gas appliances in domestic premises, whether in specific appliance rooms or other spaces where gas appliances are installed, in relation to the requirements for:

- a) design and installation
- b) correct appliance selection
- c) correct location
- d) combustion and ventilation air
- e) flues and chimneys
- f) correct commissioning
- g) correct maintenance (*see also sections 6 and 7*)

Member States should have arrangements in place either to assess the competence of operatives in order to ensure that such work is done safely and correctly.

The occupants and owners of domestic dwellings are responsible for the installation during its operation. They shall be provided with written information about the functioning, maintenance and safety of the appliances, by the operatives.

5.2. Competence of Operatives

The general requirements for competence are dealt with in section 7.

The designer of the boiler room or any other space the appliances are placed in, will usually be the responsibility of a structural engineer or heating design company in new build or refurbishment projects, However on one-off domestic installations, this responsibility for design will lie with the installer / installation company.

To ensure the safe functioning of the appliances, the safety of occupants or operatives, efficiency and the environmental considerations, the designer/operative shall have sufficient education and/or proven knowledge in the following issues:

- a) the selection of an appropriate appliance type
- b) the applicable standards (EN or national)
- c) the application of manufacturer's installation/operating instructions
- d) the calculation of ventilation requirements
- e) the design of flue duct / chimney size, route, materials etc.
- f) the design of flue termination for effective and safe performance
- g) the design of condensate drainage systems

5.3. Selection of components and equipment

New appliances to be installed in domestic dwellings have to be in compliance with the GAD and have to be CE marked. Since there are different gas qualities delivered to domestic users in the European community, it is of importance that the designer / operative is aware of the gas quality on site.

Previously Used (i.e. second-hand, previously owned or customers own) or modified appliances may not be CE Marked and so particular care needs to be taken to ensure both its fitness for purpose and its compatibility with the supplied gas. Therefore it is essential that the appropriate appliance and as appropriate, the components of the gas installation match the gas quality on site. The appliance must also be adjusted as appropriate to the actual gas quality and in compliance with the manufacturer's instructions.

5.4. Standards applying to Boiler / Appliance Rooms

As far as known at the time of writing, there are no EN standards on boiler or appliance rooms. Therefore these rooms need to be in compliance with appliance manufacturers' instructions and/or national standards.

5.4.1. Basic conditions

As the functioning of gas appliances may be affected by the construction of the room or space in which the appliance is installed, it is essential that the operative checks that the flue, ventilation and location requirements meet manufacturers instructions and any national requirements

5.4.2. Specific location requirements

Boiler rooms must meet specific appliance manufacturer's requirements and national legislation (e.g. Occupational Health and Safety, Building, Factory and Labour Law) may be applicable. The following should also be taken into account:

- fire protection and precautions
- contamination of combustion air,
- persons coming into contact with hot surfaces,
- the removal of any flue gas leakages or other dangerous gases and/or vapours which can occur in the boiler room

5.4.3. Flues / Chimneys

Where appliances are connected to a chimney (or flue), the effective operation of the appliance depends on the quality of the chimney construction. It is essential that the operative is aware of the possibility of condensation of flue gases and knowledge of the dewpoint of flue gases, together with the consequential effects. Awareness of the differing requirements for the different classification of flue types under CEN Technical Report PD CR 1749:2005 is necessary. The Standards relating to chimneys are EN 1443 "Chimneys – General requirements" and EN 13384-Parts 1 and 2: "Chimneys – Thermal and fluid dynamic calculation methods..

The operative should consider the following aspects in relation to chimney / flue construction.

5.4.4 General Chimney Requirements

- robustness of construction
- suitability of materials of construction
- fire protection of building
- tightness to flue gases and/or condensed water
- facilities/system for draining condensed water
- specific appliance and chimney manufacturer's requirements.

In addition the operative should understand the differing design and performance characteristics of the various flue / chimney types utilized in connection with gas appliances using:

- Naturally Aspirated Burner Chimneys
- Forced Draught
- Fan Diluted
- Fan Assisted Chimneys

Particular attention is required in the prevention of flue gases re-entering the dwelling and where they may create a nuisance (particularly from condensing appliances).

5.5. Appliance commissioning

The competent operative should be able to ensure that the essentials of commissioning are understood and undertaken.

a) Boilers – (Including Naturally Aspirated, Forced Draught, Fan Diluted or Fan Assisted boilers):

- Verification the capacity of the boiler in relation to the calculated heat demand
- Setting of inlet gas pressure during stand-by and operation
- Setting of burner gas pressure in compliance with the manufactures specification
- Combustion analysis (performance, efficiency and safe operation)
- Open flue spillage testing, flue flow and continuity
- Issue of commissioning data / information and User instructions

b) Fan Assisted Burners - Additional Requirements:

- Soundness testing (including a functional test of the safety devices)
- Verification of combustion / air supply
- Setting rating / air openings
- Locking adjustable components where appropriate

5.6. Maintenance (Operatives)

Operatives must be able to assess the installation against the manufacturer's installation and maintenance requirements with particular regard to the effects of the following:

- different gas qualities on the combustion air requirement and the combustion quality
- changes in gas inlet pressure on the functioning of the appliance
- changing the air supply on the combustion quality
- changing the air inlet and outlet openings in the room on the air volume
- over or under pressure in the boiler room on the supply of air
- the malfunctioning of the chimney on the gas appliances and safety of personnel inside the room or space

Moreover operatives should ideally have specific appliance information available.

6. INSPECTION AND MAINTENANCE OF INSTALLATIONS AND APPLIANCES

Regular inspection and maintenance is necessary to ensure safety, efficiency and environmental conditions in accordance with appliance manufacturers' instructions. Member States should therefore require periodic inspection for all gas installations. These inspections must be cost-effective, neutral and meet highest quality requirements and in this respect it is necessary to clarify the difference between 'inspection' and 'maintenance'. The following definitions are proposed:

Inspection - The checking or testing of an installation, by duly competent operatives, against established parameters (which may relate to emission limits), its performance and its conformance to safety requirements (checking the actual condition against a target condition). On completion of the inspection, the user/responsible

person is given a written report confirming either compliance with all test parameters or detailing identified deficiencies (where these are deemed so significant as to warrant such action).

Maintenance - The performance of preventative examinations, checks, cleaning, adjustment and repairs necessary to maintain target conditions, and the remedying of deficiencies identified during inspection by duly qualified personnel, re-establishing target conditions as necessary.

Regular maintenance, incorporating all necessary safety examinations and operations, may avoid the need for independent inspection, but any independent inspection needs to be thorough enough to identify all necessary corrective maintenance.

Marcogaz and GCI-UICP recommend the following:

- a) Inspections and maintenance should be based on standardised schemes to reduce costs and guarantee their neutral character;

and

- b) Whenever possible, these inspections should be linked with the regular inspection schemes under article 8 of the Energy Performance of Buildings Directive.

The installer should have the competence and skills for adequate maintenance and inspection of the installation, which includes:

- cleaning boiler room and appliances
- functional check on safety devices
- checking of chimney tightness to rooms
- checking combustion air and ventilation openings/facilities
- combustion analysis, including efficiency as appropriate
- re-setting of burner controls
- establishment of optimum efficiency
- check that there is no presence of flammable materials stored in the boiler room
- ensure that any flammable materials are kept at a safe distance from the appliance or associated flue
- EPBD Article 8 inspection/advice (pr EN 15378 Boiler Inspections)
- issue of documentation and necessary advice to the responsible person

Individual Member States may have requirements for independent / third party inspection of appliances, particularly new and replacement work. Alternatively, there may be a need to advise an authority or self-certify compliance with national requirements. The operative needs to be aware of existence of any such regime in the Host Nation.

7. COMPETENCE OF OPERATIVES

It is recognized that most operatives will only work within their own Country of Origin and in doing so will be operating within the competence framework and work practices applied within that country. The movement of operatives across national borders are likely to be relatively small, however where this occurs, it is essential that in order to promote consistent application of appropriate work practices by individual operatives, irrespective of their Country of Origin, a common framework of competence verification requirements needs to be agreed for implementation with mutual recognition within Member States.

The over-riding principle must be that the operative (and business) satisfies the requirements for necessary qualification (and business registration where applicable) and experience in the Country of Origin. In order to consider whether an operative can be authorized to work in a Host State, it follows that the Host State will need an arrangement to confirm that the operative meets the Country of Origin requirements, whatever they may be. However, for consistency, this should include training and experience in the application of EN 1775 and appliance installation, commissioning, maintenance, testing and inspection as detailed in sections 4 and 5 above, unless only a limited scope of work is to be undertaken.

Where the Country of Origin has no formal scheme for the registration of individual operatives, evidence of such training and experience would need to be provided, preferably through a portfolio of evidence supported by an appropriate audit trail. This may include reference to previous employers and/or training providers. In the absence of a portfolio, evidence of previous training and experience would need to be obtained by direct enquiry.

In situations where there is an individual operative registration scheme, evidence of current registration would serve as confirmation of training and experience, which would not need to be supported by a portfolio.

However, national legislation in the Host State may require additional competence assessment and individual and/or business registration. (Where this is justified in the interest of protection of public safety, such requirement would not be in breach of harmonized legislation.). In Host States where this is the case, the operative would need to comply with those reasonable requirements before being able to carry out work. Similarly, if the requirement extends to sole-trader or larger business registration, the individual would need to comply. (See Appendix 1 for an example of requirements in a specific Member State).

Should these proposals result in a mutual recognition scheme that has more stringent requirements than one or more Member States, installers who have no intention of working outside of those States should only be required to meet their own national requirements.

However, the long-term aim proposed in this paper is to achieve a common approach for the assessment and declaration of competence in safe gas work throughout the EU. For this to be achieved it will be necessary to:

- Identify existing arrangements in all Member States and to extract the most stringent requirements
- Consider the justification for such requirements and confirm whether or not they need to be given priority, thereby establishing the appropriate minimum level of requirement

Develop a means of assessing candidate knowledge and performance of the requirements, leading to certification by a recognized entity

7.1. Requirements to be competent

All Member States have general requirements covering the need for operatives to be appropriately competent to carry out the work they do safely. However, the way this is dealt with varies, as does the extension of this requirement into the area of general vocational competence. In order to achieve a consistent treatment of this key requirement, a definition of competency in safe and effective gas work is therefore required. The following is proposed:

"Competence in gas installation and maintenance requires the operative to possess sufficient knowledge and practical skill, and to have had appropriate and sufficient experience to carry out the job in hand safely, with due regard to good working practice."

In order to be able to practice competently, knowledge must be kept up to date with changes in the law, technology and safe working practice and so arrangements for this should be in place.

It can be considered that knowledge and practical skill is best underpinned by:

- exposure to appropriate training, (preferably leading to the award of a qualification which is recognised by the country of origin)
- verifiable records of training*
- assessment of retained knowledge and skill (practical and / or theoretical)
- independent verification
- accreditation to ISO 17024

* Such verification could include any of the following in any combination:

- Evidence of Continuous Personal Development
- Interview/professional discussion
- Portfolio of training and experience, verified by a competent person

- Written confirmation from present / previous employer
- Written assessment of knowledge and understanding
- Performance assessment on or off the job
- Verification of work outcomes (quality control etc.)
- Membership of a registration scheme operated in a Member State

Finally, the operative must be aware of all legal requirements and standards applicable in the Host Nation and be able to understand such requirements whether or not they are available in the language of the Country of Origin.

8. DIY Activity

All member states have concerns with regard to the gas safety implications of non-competent persons undertaking gas work. It is acknowledged that the restriction of the sale of gas appliances to competent persons or the application of a notification process, across all member states, would be impracticable.

Member states should require all key stakeholders to inform the public of the dangers of undertaking gas work. Key stakeholders are considered to include appliance manufacturers, suppliers and trade outlets. Each of the stakeholders should provide information stating that the gas installation / maintenance should only be undertaken by an approved competent operative, in order to ensure that the appliance is installed in a safe manner and that gas connections, flueing and ventilation aspects comply with appropriate standards of safety.

This information should be promoted through the following means:

- manufacturers installation instructions
- manufacturers Users instructions
- appliance packaging
- display notices
- warranty documents

9. RECOMMENDATIONS

In order to facilitate an approach based on mutual recognition, an agreed minimum requirement and means of assessing competence/conformance with it should be established.

EN 1775 and Manufacturer's Appliance Instructions form a basis upon which competence requirements, training and, where appropriate in the Host State, assessment criteria and performance standards may be developed for use within an individual certification scheme (possibly accredited and conforming to ISO 17024 (Certification of Persons)).

Individual competence requirements, whether through required 'training and experience' and / or independently validated individual competence assessment, shall ensure a consistent approach to competence requirements including adequate treatment of pipework and appliance installation, maintenance, testing and commissioning.

All Member States have existing provisions, which recognize that businesses can operate legitimately whilst varying in size and structure from sole-trader to large company (including multi-national). There may be legal authorization/registration requirements, which could be supported by an inspection regime, either for specific work activities or on a more general periodic basis.

As this will vary between the Member States, it will be necessary to establish controls that:

- a) ensure that the operative is fully conversant with the requirements before being able to work unsupervised in the specific Member State, or
- b) ensure direct supervision of the operative by a competent person, recognised by the Host State, to ensure compliance on an ongoing basis or as an interim measure pending operative training and assessment.

Otherwise the operative would be unable to carry out work in Member States other than that of the country of origin.

In order to fully facilitate movement of operatives between Member States a mutual recognition framework/matrix, agreed by all States, will be required. This should be designed to help Member States and those operatives wishing to relocate to be able to benchmark their respective knowledge, experience and qualifications against the requirements of the host country for particular categories of work, In particular the mutual recognition framework should include:

- a) Certificates of qualifications with copies of the respective syllabus
- b) Translated CV showing work experience
- c) Membership of any gas registration scheme either voluntary or compulsory

The host country can then confirm that the operative has the appropriate experience and qualifications prior to undertaking checks to test their understanding of safe gas work within the host country and would include:

- a) Understanding of host country Legislation pertaining to appropriate gas work
- b) Language/ability to interpret host country standards / installation instructions
- c) Working practices/use of materials within host country
- d) Understanding of unsafe downstream gas safety installations and action required
- e) Emergency Procedures, what to do and who to report to

With this mutual recognition framework/matrix in place operatives wishing to move to another member state will be able to map their qualifications syllabus, work experience and knowledge of the host country requirements and take appropriate action such as further training or improving language skills prior to making the change.

Next Steps

The following work streams needs to be developed in order to provide the basis to facilitate the movement of operatives between states, whilst meeting the required level confirmation of competence by the Host Nation.

- a) Develop a practical framework for the mutual recognition of existing qualification / certification schemes.
- b) Utilise the specific sector for mutual recognition qualifications (Directive on Services in the Internal Market) and consider whether the European Qualification Framework (EFQ) can help to establish a such a scheme
- c) Develop a simple means of Host Nations assessing awareness of local Regulations and Standards