PD CEN/TR 16940:2016

BSI Standards Publication

Domestic gas installations — Recommendations for safety

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National foreword

This Published Document is the UK implementation of CEN/TR 16940:2016.

The UK participation in its preparation was entrusted to Technical Committee GSE/33, Gas Supply.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2016

ISBN 978 0 580 91804 9

ICS 91.140.40

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 December 2016.

Amendments/corrigenda issued since publication

Date	Text affected

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 16940

December 2016

ICS 91.140.40

English Version

Domestic gas installations - Recommendations for safety

Installations intérieures de gaz - Recommandations pour la sécurité

Gas Installationen in Haushalten - Empfehlungen für die Sicherheit

This Technical Report was approved by CEN on 18 January 2016.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. CEN/TR 16940:2016 E

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European foreword

This document (CEN/TR 16940:2016) has been prepared by CEN/SFG_I/SFG_U JWG “Safety of domestic gas installations”, the secretariat of which is held by AFNOR/BNG.

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Introduction

As a result of the liberalization of the gas and services market in Europe and the need to reduce potential barriers to trade, the development of mutually recognized standards covering design, 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 is considered important.

The quality and safety of the gas installations are generally ensured through competent operatives, installers and inspectors complying with technical regulations, inspection and maintenance regimes, safety inspection of work .

To assist and facilitate the movement of operatives between states, a mutual recognition framework/matrix that is agreed by all Member States can be envisaged. 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. In particular, the mutual recognition framework is described in the recommendations at the end of this document.

1 Scope

This Technical Report gives recommendations to ensure the quality and safety of domestic gas installations. This Technical Report covers pipe work, appliances installation, their combustion air supply and flue products exhaust commissioning, inspection and maintenance activities carried out by operatives.

This document addresses the following three main factors, which have an influence on gas safety in general:

a) quality and safety of components of gas installations and gas appliances,

b) quality of the work when gas installations are constructed and commissioned,

c) inspection and maintenance of installations and gas appliances.

Potential ways in which individual competence of operatives and/or businesses can be ensured and mutually recognized between Member States are considered.

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

It does not address metering or non-domestic (industrial and commercial) installations.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TR 1749, *European scheme for the classification of gas appliances according to the method of evacuation of the combustion products (types)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

(From CEN Guide 14)

(From Marcogaz National Competency Framework)

3.1
inspection
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), followed by the supply of 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)

3.2
maintenance
performance of preventative examinations, checks, cleaning, adjustment and repairs necessary to maintain target conditions, and the remedying of deficiencies identified during inspection by duly competent operatives, re-establishing target conditions as necessary

4 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 competencies needed are given in 7.2; how to assess them in dealt with is given in 8.1 and 8.2.

In order to ensure quality and safety of gas installations, the following elements shall be considered:

— technical requirements for pipe work;

— technical requirements for appliance installations, including combustion air supply, ventilation and flue products exhaust;

— prescriptions for inspection and maintenance of installations and appliances;

— if applicable, prescriptions for third party safety inspection of new and existing installations;

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.

— assuring competence of operatives.

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 European 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.

5 General technical requirements for pipework

General technical requirements for pipework, so as to achieve a consistent basis for the safe and efficient installation of gas pipework in domestic premises, are given in EN 1775.

EN 1775 covers principles of gas supply systems.

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

— design;

It is emphasized that gas pipework shall be sized so that the pressure at the inlet of all gas appliances is compatible with their safe and effective operation.

— installation and construction;

— testing;

— commissioning;

— operation and maintenance;

— working on operating pipe.

It shall 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, gas metering systems, LPG storage vessels or single appliance LPG installations without fixed pipework, achieved by a flexible appliance connector from an adjacent LPG storage cylinder.

6 Technical requirements for appliance installations

6.1 General

This clause 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) flue products exhaust;

f) correct commissioning;

g) correct maintenance.

It shall be applied by competent persons who have suitable knowledge, experience and approval.

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.

Single appliance LPG installations without fixed pipework, achieved by a flexible appliance connector from an adjacent LPG storage cylinder are also considered in this document.

6.2 Competence of operatives

The general requirements for competence are dealt with in 8.1.

The design 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 areas:

a) the selection of an appropriate appliance type;

b) the national installation regulation;

c) the applicable standards (European or national);

d) the application of manufacturer's installation/operating instructions;

e) the calculation of ventilation requirements;

f) the design of flue duct / chimney size, route, materials, etc.;

g) the design of flue termination for effective and safe performance;

h) the design of condensate drainage systems, when applicable.

6.3 Selection of components and equipment

New appliances to be installed in domestic dwellings have to be in compliance with the Gas Appliances Directive and have to be CE marked with an appliance category allowed in the Member state in which they are installed. 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 range of gas quality on site.

Previously used (i.e. second-hand, previously owned or customers own) or modified appliances can be found not being CE marked and so particular care needs to be taken to ensure both their fitness for purpose and their compatibility with the supplied gas. Therefore, it is essential that a suitable appliance and, as appropriate, the components of the gas installation match the gas quality on site. As gas quality may change over time, adjustment to the quality of the gas supplied on the day of commissioning can result in unsafe conditions when gas quality varies afterwards. Settings shall be able to accommodate the range corresponding to the appliance category (see EN 437) declared by the manufacturer.

The designer/operative shall take into account the national safety regulations especially those regarding the connection of gas appliances through a flexible appliance connector or a length of rigid pipe work, the compatibility of connectors and the use, when necessary, of a safety shut off device.

A manually operated valve or equivalent mean shall be installed on the fixed pipework in the immediate vicinity of each appliance in order to allow a quick shut off of the gas flow to the appliance or, if applicable and allowed, group of appliances in case of emergency.

Where an en fitting is designed to permit quick connection and disconnection of the flexible appliance connector, this fitting shall be self-sealing and shall prevent the release of gas from the upstream pipework. This fitting shall be designed to prevent accidental disconnection and incorrect assembly.

6.4 Requirements applying to appliance rooms

6.4.1 General

As far as known at the time or writing, there are no European Standards on appliance rooms. Therefore, these rooms shall be in compliance with national regulations/standards and appliance manufacturers' instructions. General principles of coherence are described in Annex A.

6.4.2 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 manufacturer's instructions and any national safety regulations.

When selecting gas appliances, coherence shall be ensured between the type of appliance regarding the evacuation of combustion products (see CEN/TR 1749), the type of appliance room and its ventilation. The rules of installation and the rules for supply of combustion air, ventilation and for fire protection are defined in the national safety regulations.

6.4.3 Specific location requirements

6.4.3.1 Boiler rooms

Boiler rooms shall 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 appliance room.

6.4.3.2 Cooking and washing appliance rooms

Installation of cooking and washing appliances can only be made in sufficiently ventilated rooms according to national or local codes.

Ventilation shall be able to supply appliances with enough combustion air according to manufacturer's instructions and to evacuate flue products in order to prevent in the room or space concerned, a concentration of substances harmful to health likely to present a danger.

Such appliances shall not be installed in living rooms as sleeping rooms, bathrooms or dining rooms separate from kitchens.

It is supposed for the application of the present document that all gas appliances installed to be used indoor are equipped with a flame safety device (or an equivalent system). Unfortunately, many gas domestic cooking appliances still exist which are not equipped with such a device on all the burners. In that case, the ventilation system shall be designed in order to avoid an accumulation of unburned gases, according to national regulations.

6.4.3.3 Other type A appliance rooms

For health and safety reasons, it is not recommended to install and use type A appliances other than cooking and washing appliances inside domestic dwellings. Consequently, it may be only done if allowed by and according to national or local codes and in addition according to the appliance manufacturer's instructions.

6.4.4 Flue exhaust systems

6.4.4.1 General

Where appliances are connected to a flue, the effective operation of the appliance depends on the quality of the flue system design and construction. It is essential that the operative is aware of the possibility of condensation of flue gases and knowledge of the dew point of flue gases, together with the consequential effects. Awareness of the differing requirements for the different classification of flue types under CEN/TR 1749 is necessary.

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

General flue systems requirements include:

— 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 shall understand the differing design and performance characteristics of the various flue/chimney types utilized in connection with gas appliances taking into account draught conditions required by the appliance manufacturer.

6.4.4.2 Chimney requirements

Chimneys can be of various types:

— natural draught chimney as individual flue system;

— natural draught chimney as common flue system;

— fan assisted chimney (negative pressure) as common flue system with a fan mounted atop the chimney;

— forced draught chimney as individual flue system;

— forced draught chimney as individual flue system designed to operate at a positive pressure (e.g. with a resistance to condensed water in case of condensing appliances).

The European Standards relating to chimneys are EN 1443, EN 1856 (all parts) and EN 13384 (all parts).

The connection of the appliance with the chimney shall be made with an appropriate duct (material, size, tightness, slope) in compliance with applicable regulations and standards.

6.4.4.3 Other systems requirements

These systems can be:

— individual duct system supplying combustion air and flue gases with flue gases at a negative pressure;

— individual duct system supplying combustion air and flue gases with flue gases at a positive pressure;

— common duct system supplying combustion air and flue gases with flue gases at a negative pressure;

— common duct system supplying combustion air and flue gases with flue gases at a positive pressure.

Flue ducts shall be designed and installed so as to avoid any dangerous release of combustion products into habitatable rooms. Particular attention should be paid to the following possible situations:

— leakages from flue systems operating at positive pressure;

— common flue duct systems operating at positive pressure;

— common duct systems at negative pressure (internal recirculation).

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).

6.5 Appliance commissioning

6.5.1 General

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

— checking installation and ventilation conditions,

— verification of gas connections and their safety devices,

— verification of correct combustion / combustion air supply / flue evacuation,

— issue of commissioning data / information and user instructions.

Before putting into service a gas appliance, it is mandatory to check that it is adapted to local gas quality and supply pressure.

Information about local gas quality and supply pressure shall be given by local gas distribution system operator (DSO) as: gas family and group (2H, 2L, 2E, ….) and normal supply pressure to appliances (20 mbar, 25 mbar) (see EN 437).

NOTE Gas pressure at the delivery point is generally higher than normal supply pressure to appliances in order to allow a standard pressure drop in the downstream installation pipework.

According to 2009/142/EC Gas Appliances Directive, CR 1472 and gas appliances standards, there are markings on the appliances and their packages which indicate gas families and groups (2H, 2L, 2E, ….) and normal supply pressure(s) to appliances (20 mbar, 25 mbar) for which the appliance was set by the manufacturer. The direct countries of destination of the appliance are generally also given.

Appliances can only be put into service in accordance with the manufacturer's instructions when there is a perfect matching between information given by the local DSO and markings of the appliances. In case of doubt, refer to manufacturer's instruction manual and if the doubt persists contact the manufacturer's after sale services.

When local gas quality and/or supply pressure do not match the labelling of the appliance, it might be possible to convert the appliance to another gas family, group or supply pressure. Only conversion operations allowed by the manufacturer in relationship with appliance category can be realized by the installer. Appliance categories are marked on the appliance and conversion procedure is given in the manufacturer's instruction manual. In case of doubt, contact the manufacturer's after sale services.

Conversion procedures are generally simple and only need to change orifices or restrictors. It can also be necessary to adjust burner pressure through the pressure governor of the appliance or to adjust primary air intake. Recent and very high performance appliances like condensing boilers may also need to adjust combustion parameters by measuring CO_2 or O_2 concentration in combustion products. In any case, conversion shall only be made according to manufacturer's instructions and only by a competent operative.

6.5.2 Specific requirements for type-B and type C appliances

— Verification of the capacity of the appliance in relation to the calculated heat demand, and if applicable hot water demand,

— if applicable, setting of burner gas pressure in compliance with the manufacturer's specification,

— open flue spillage testing, flue flow and continuity,

— combustion analysis (performance, efficiency and safe operation) and ambient air quality check (CO in the vicinity of operating appliances),

NOTE 1 Depending on the type of appliance and the appliance instructions, this will often require that a portable electrical combustion gas analyser [often referred to colloquially as a "flue gas analyser" (FGA)] of the type specified in EN 50379–1, EN 50379–2 or EN 50379–3 (depending on the type of measurement required), is available to the operative and the operative is competent in its use and the interpretation of any reading obtained.

NOTE 2 CLC/TS 50612 provides a guide to the use of FGA in the process of commissioning, servicing and maintaining gas fired central heating boilers.

6.5.3 Specific additional requirements for fan assisted burners and for forced draught flue systems designed to operate at a positive pressure

— Soundness testing (including a functional test of the safety devices),

— setting rating / air openings,

— locking adjustable components where appropriate.

7 Inspection and maintenance of installations and appliances

7.1 General requirements

Regular inspection and maintenance is necessary to ensure safety, efficiency and environmental conditions in accordance with appliance manufacturers' instructions. Periodic inspection should therefore be required for all gas installations. These inspections shall be neutral and meet highest quality requirements and in this respect it is necessary to clarify the difference between 'inspection' and 'maintenance'.

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.

a) Inspections and maintenance should be based on standardized 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.

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

7.2 Requirements for operatives

Operatives shall be able to assess the installation against the manufacturer's installation, commissioning 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 supply 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,

— the different types of appliances according to CEN/TR 1749.

Moreover, operatives should ideally have specific appliance information available.

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

— cleaning appliances (burner, air and combustion circuits, heat exchanger),

— functional check on safety devices,

— checking of draught conditions and flue/chimney tightness to rooms,

— checking of appliance gas connection,

— checking combustion air and ventilation openings/facilities,

— combustion analysis (including efficiency as appropriate), and air quality analysis,

— re-setting of burner controls,

— establishment of optimum efficiency,

— check that there is no presence of flammable materials in the vicinity of the appliance,

— ensure that any flammable materials are kept at a safe distance from the appliance or associated flue,

— EPBD Article 8 inspection/advice (EN 15378 Boiler Inspections),

— issue of documentation and necessary advice to the responsible person (e.g. home or building owner, tenant, end user, ...).

8 Competence of operatives

8.1 General

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 is 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 shall 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 Clause 4 and Clauses 5 to 7 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/regulation 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.

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 document is to achieve a common approach for the assessment and declaration of competence in safe gas work throughout the European Union. 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 an accredited entity.

8.2 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, operatives should be required 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 shall 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 one or a combination of several of the following ways:

— exposure to appropriate training, (preferably leading to the award of a qualification which is recognized by the country of origin);

— verifiable records of training;

— assessment of retained knowledge and skill (practical and / or theoretical);

— independent verification;

— certification by an accredited certification scheme according to EN ISO/IEC 17024.

Records for the verification of training 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 shall 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.

8.3 DIY (Do It Yourself) activity

Appliance manufacturers, suppliers and trade outlets should provide information stating that the gas installation / maintenance should only be undertaken by a 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.

8.4 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 EN ISO/IEC 17024).

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, recognized 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 case a mutual recognition framework/matrix, is set up, this mutual recognition framework should include:

c) certificates of qualifications with copies of the respective syllabus,

d) translated CV showing work experience,

e) 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:

f) understanding of host country legislation pertaining to appropriate gas work,

g) language/ability to interpret host country standards / installation instructions,

h) working practices/use of materials within host country,

i) understanding of unsafe downstream gas safety installations and action required,

j) emergency procedures, what to do and who to report to,

k) public liability, when applicable.

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.

Annex A
(informative)

Coherence between types of gas appliances and ventilation/flue products exhausts

A.1 General

Classification of gas appliances according to the method of evacuation of the combustion products (types) is given in CEN/TR 1749.

It is of major importance for safety and rational use of energy to ensure the compatibility between types of gas appliances, ventilation of appliance rooms, and the flue products exhaust system.

A.2 Type A appliances

*An appliance not intended for connection to a flue or to a device for evacuating the products of combustion to the outside of the room in which the appliance is installed. (*CEN/TR 1749*)*

It can be:

— cooking appliances;

— water-heaters;

— space heaters.

Combustion products of type A appliances are evacuated outside through the ventilation system of the room. So it shall exist specific requirements related to the type, the size and ventilation of rooms where type A appliances can be installed and used.

For health and safety reasons, it is not recommended and often forbidden by national or local codes to install and use type A water-heaters or space heaters inside domestic dwellings but they still can be found in existing installations and it is not always possible to replace them by type B or type C appliances. A particular attention shall be paid to installation and use indoor of type A water-heaters or space heaters and it will be necessary to refer to national or local codes.

A.3 Type B appliances

*An appliance intended to be connected to a flue that evacuates the products of combustion to the outside of the room containing the appliance. The combustion air is drawn directly from the room. (*CEN/TR 1749*)*

It can be:

— cooking appliances (exceptionally);

— water-heaters;

— space heaters;

— boilers.

A clear distinction shall be made between:

— natural draught type B appliances (B_{-1}) which are very sensible to combustion air supply and draught in the combustion products system;

— type B appliance incorporating a draught diverter ($B_{1\_}$; B4_)which contribute to the ventilation;

— other type B appliances.

As the combustion air is drawn directly from the room, it shall exist specific requirements related to the type, the size and ventilation of rooms where type B appliances can be installed and used.

It shall also exist requirements related to the connection of type B appliances to the combustion products system and related to this system itself.

Type B indoor gas appliances conforming to 2009/142/EC directive (ER 3.4.3.) are so constructed that in abnormal draught conditions there is no release of combustion products in a dangerous quantity into the room concerned (spill switch or analog system); it is designed to prevent from accidental and external risks such as thermal inversion or mechanical obstruction; it does not authorize to install and use such appliance without a proper supply of combustion air and a proper combustion products system.

A.4 Type C appliances

*An appliance in which the combustion circuit (air supply, combustion chamber, heat exchanger and evacuation of the products of combustion) is sealed with respect to the room in which the appliance is installed. (*CEN/TR 1749*)*

It can be:

— water-heaters;

— space heaters;

— boilers.

Such appliances are not dependant of the ventilation for their combustion air supply.

A clear distinction shall be made between:

— type C appliances approved, installed and used with their own combustion air and combustion products ducts (C1, C3, C5, C7, …);

— type C appliances connected to combustion air and/or combustion products ducts which are not approved with the appliance and are generally part of the building (C2, C4, C6, C8, …);

— type C appliances in which all pressurized parts of the appliance and the attached duct containing the products of combustion are completely enclosed by parts of the appliance and the duct supplying combustion air;

— type C appliances in which some pressurized parts of the appliance or the attached duct containing the products of combustion are not completely enclosed by parts of the appliance and the duct supplying combustion air.

Depending on these differences, a special attention shall be paid to:

— the route and location of combustion air ducts and terminal;

— the route and location of combustion products ducts and terminal;

— the connection of appliances to separate combustion air and/or combustion products systems.

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