COMMISSION OF THE EUROPEAN COMMUNITIES

COM(74) 2179 final
Brussels, 20 December 1974

Proposal for a

COUNCIL DIRECTIVE

on the approximation of the laws of the Member States relating to appliances using gaseous fuels, to safety and control devices for these appliances and to methods for inspecting these appliances

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Proposal for a

COUNCIL DIRECTIVE

on the approximation of the laws of the Member States relating to appliances using gaseous fuels for the instantaneous production of hot water for sanitary purposes

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(submitted to the Council by the Commission)

1. EXPLANATORY MEMORANDUM

The decision taken in 1969 by the Council, acting on a proposal from the Commission, to include the sector of non-electrical heating, cooking and water-heating appliances in the general programme on the removal of technical barriers to trade, was a good one.

There are indeed serious barriers to trade in this sector, which is of considerable economic importance, but ideas on the subject differed so much from one Member State to another that it was only after considerable effort that the Commission managed to fulfil its commitments and keep to the timetable which the Council had decided on in its resolution on industrial policy adopted on 19 December 1973 (*). According to this timetable it was required to forward to the Council, before 1 January 1975, an outline directive enumerating the general principles governing the sector as a whole, together with an initial special directive relating to certain appliances.

A comparative study of the laws, regulations and administrative provisions in force in the Member states in the sector of appliances using gaseous fuels has revealed that there are considerable divergences between these regulations governing, on the one hand, production criteria and safety systems and, on the other the conditions under which these appliances are tested.

(*) OJ N° C 117, 31 December 1973

The difficulties encountered in the trade in these appliances between the Member states an mainly due to the obligation to obtain "national approval" for these appliances and to the fact that they have to bear the appropriate marks and seals in the various countries. This obligation is based on either national regulations or standards or other specifications compliance with which is mandatory.

At the level of trade, this means that manufacturers have to diversify their range of products in order to take account of regulations in force in the Member state where these gas appliances are to be used and will be subjected to repeated inspections, which are frequently carried out in accordance with different procedures.

The national laws at present in force are justified by the need to protect the consumer, and harmonization appears to be the only possible way to remove the drawbacks caused by the divergence of these laws and thus create a favourable climate for trade. This, however, is difficult. During the last few decades, the natural resources of some Member states, and the discovery of considerable reserves of natural gas, have led the gas industries to put on the market combustible gases of different types and properties (Wobbe index, toxicity rating, etc.). These can be broken down into three types :

(1) natural gas;
(2) manufactured gas;
(3) liquified petroleum gas.

That has frequently meant that manufacturers have had to produce appliances capable of "conversion" to these three types of gas. But in addition, the design of gas appliances has had to be varied to take account of other important points which have helped to increase the complexity of the situation in this sector. These are, in particular :

- the different installation conditions required by the regulations,
- different gas and water pressures,
- dimensions of tubes and connections in force in the different countries and subject to national standards.

As a result, the Member states, which have for a long time conducted their own independant efforts to rationalize their production and define design and safety rules, have elaborated standards and drawn up provisions based mainly upon their national situation.

Examination of the different laws and regulations in force shows that the technical and administrative provisions in the field concerned vary enormously from one Member state to another.

These difficulties, which prevent manufacturers and consumers form benefiting from the economies of scale to be offered by free access to a market of 250 million consumers, cannot all be resolved by directives relating to the products, for at all events it will be necessary for these products to be adapted to the conditions in force (particularly the type and pressure of the gas) in the place where they are to be installed.

However, it has become evident that a high degree of simplification of the approval procedures could be achieved if a mutual recognition of controls, based on test uniformy accepted throughout the Community and carried out by recognised bodies in each Member state, could be perfected.

This general procedure and the provisions applying to all the appliances in this industrial sector are defined in the attached outline directive. It is accompanied by an initial special directive on water-heaters which indicates a tentative application of the principles embodied in the outline directive and thus points out the path along which the Commission intends to directi its efforts.

2. COMMENTS ON THE PROPOSED GENERAL DIRECTIVE

General comments

The free movement of appliances using gaseous fuels is lampered by obstacles due in particular to the differences in safety criteria, and consequently in the laws adopted to ensure compliance with them in the various Member states.

The Commission has drawing this general Directive, and will draw up special directives in the future, with the aim of harmonizing regulations in this important sector.

With the entry into force of the general Directive, Community trade in gas appliances will be greatly facilitated. As special directives harmonizing specific sectors come into force, manufacturers will be able to construct their products in conformity with common laws, thus obtaining access to the whole Community market. These special directives may be based either on a harmonized standard to which reference is made or on technical annexes.

The harmonization system proposed by the Commission is the "optional" method. This means that the Directive is merely intended supplement, and not replace, the legal provisions and regulations in force in individual Member states as far as their domestic markets are concerned.

In other words, since this Directive does not compulsorily replace the provisions at present in force in individual Member states, a manufacturer who is not interested in the much more extensive market offered by the Community, may continue his production according to the legal provisions in his country and may try out technical innovations purely for use on the domestic market. If, however, for a particular category of appliance, a manufacturer feels that his interests will be better served by a much larger potential market such as that offered by the Community, he will be free to apply this Directive in the knowledge that, if he complies with its contents, his gas appliance will be accepted on the markets of all the other Member states.

Some special directives may nevertheless lay down detailed rules concerning the substitution of the Community's technical requirements for national provisions in force, when particularly important problems concerning security are involved by the directive.

3. COMMENTS ON THE PROPOSAL FOR A SPECIAL DIRECTIVE

General comments

The sector of appliances using gaseous fuels for instantaneous production of hot water for domestic purposes has been taken as the first example of the application of the general directive in view of its specific features :

- production of important series of appliances intended for very wide circulation within the Community,
- difficulties not as great as in other sectors in harmonizing the different national laws and regulations concerning manufacturing requirements and verification systems.

The rated capacity values, to which this directive applies, are those used at present and contemplated for the future for the production of gas appliances for domestic use. It was felt preferable to have four categories of appliance, each with a fairly wide range of capacity values, in order to avoid interchangeability of components between appliances in different capacity ranges, as this might adversely affect the functioning of the appliance and endanger the user.

The Directive is intended particularly to harmonize aspects closely connected with safety but it will also define acceptable performance values in view of the current need to conserve energy.
An effort has been made as far as possible to leave the manufacturer free to decide upon production specifications, plans and drawings in order to allow free competition. Special attention has been given to defining the conditions to be fulfilled and to the methods for securing reproducibility of tests to ensure that these conditions have been fulfilled.

The possibility of allowing a special directive to contain certain exceptions may be contemplated, provided its scope and limits can be clearly defined.

The harmonization system proposed by the Commission is the "optional" method, this means that the Directive must be applied for trade in gas appliances between Member states, but that within each Member state the manufacturer has the choice of putting on the market a gas appliance conforming either to the Community Directive or to national regulations.

4. CONSULTATION WITH INTERESTED BODIES

Praparatory to this proposal for a directive, a very detailed examination of the various national regulations was first carried out.
Extensive use was made of results obtained from standardization and inspection bodies.
From the preparatory stage, there were frequent contacts with consumer associations, inspection authorities and industry.
This procedure allowed the Commission staff to prepare a consistent draft directive which was then discussed in detail at meetings of the working party of Commission experts to which the consumers associations, inspection and standardization bodies and the european manufacturers associations were invited.

5. CONSULTATION OF THE EUROPEAN PARLIAMENT AND THE ECONOMIC AND SOCIAL COMMITTEE

Pursuant to the second paragraph of Article 100 of the Treaty, the opinion of these two bodies is necessary as the implementation of the provisions laid down will involve the amendment of legislation in some Member states.

ANNEX TO THE EXPLANATORY MEMORANDUM

List of the main laws in force in the Member states relating to appliances using gaseous fuels

GERMANY

- Law on the energy industry 13 December 1935 (RGBL I, p. 1451)
- Law on the technical working equipment 24 June 1968 (BGBL I, p. 717)

BELGIUM

- Law of 12 April 1965 on the transport of gaseous and other products by pipes.

FRANCE

- Décret n° 62-608 of 23 May 1962
- Arrêté of 15 October 1962 as amended by arrêtés of 17 October 1963, 31 March 1964 and 17 March 1967
- Arrêté of 21 February 1966 as amended by arrêté of 15 September 1966
- Décret n° 54856 of 13 April 1954.

ITALY

- Law of 16 June 1927 n° 1132 (Constitution of the National Association for Combustion Control)
- Ministerial decree of 12 July 1912 as amended by the ministerial decrees of 15 October 1924 and 26 February 1927
- Law of 6 December 1971 n° 1083 (Standard for the safe use of combustible gas).

NETHERLANDS

- Standards for domestic gas appliances, natural gas, June 1968
  Amendments "Gas" 88, 6, 302, June 1968.
- Standards for central heating boilers, January 1965
  Amendments "Gas" 88, 6, 302, June 1968.
- Standards for large kitchen appliances, August 1965
  Amendments "Gas" 88, 6, 302, June 1968.

UNITED KINGDOM

"Regulations 1973" on heating appliances.

PROPOSAL FOR A COUNCIL DIRECITVE

on the approximation of the laws of the Member States on provisions common to appliances using gaseous fuels, to safety and control devices intended for these appliances, and to the methods of inspection of these appliances

THE COUNCIL OF THE EUROPEAN ECONOMIC COMMUNITY,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 100 thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Parliament,

Having regard to the Opinion of the Economic and Social Committe,

Whereas in some Member States mandatory provisions determine the technical charateristics of construction, of inspection and/or of operation of appliances using gaseous fuels; whereas these requirements differ from one Member State to another; whereas these differences hinder trade and may create unequal conditions of competition within the European Economic Community;

Whereas these hindrances to the establishment and functioning of the common market may be reduced and eliminated if the same apply in each of the Member States, whether they complement or replace its present laws;

Whereas to checks on compliance with these technical requirements are necessary in order to protect effectively users and others; whereas the existing inspection procedures differ from one Meber State to another, and whereas in order to achieve the free movement of the appliances within the common market and to avoid appliances in question, it is necessary to provide for mutual recognition of inspection operations among the Member States;

Whereas, in order to facilitate this mutual recognition of inspection measures it is necessary in particular to establish adequate EEC approval and EEC verification procedures, and to harmonize the criteria to be taken into account for designating the bodies responsible for carrying out verifications;

Whereas in each Member State the responsibility of the authorities which carry out the inspection is defined in a different way, making harmonisation in this field necessary;

Whereas the presence on an appliance using gaseous fuels of EEC signs or marks indicating the EEC approval procedure to which is has been subjected implies that the appliance satisfies the relevant technical requirements and therefore that when the appliance is imported or put into operation it is unnecessary to repeat the inspections which have already been carried out;

Whereas national rules in the sector of appliances using gaseous fuels cover numerous classes of appliances using gaseous fuels which have widely differing usages and capacities; whereas it is appropriate to lay down in this Directive general provisions dealing in particular with EEC approval and EEC verification procedures; whereas special directives for each class of appliance lay down requirements concerning the technical design and the procedures for inspection of these appliances and, where appropriate, the conditions under which the Community technical requirements are to replace national provisions in force;

Whereas in order to allow for technical progress, prompt adaptation of the tecnical requirements laid down in the directives on appliances using gaseous fules is necessary; whereas in order to facilitate the implementation of the measures necessary for this purpose, a procedure establishing close co-operation between the Member States and the Commission within the Committee on the adaptation to technical progress of directives for removing technical barriers to trade in the sector of appliances using gaseous fules must be laid down;

Whereas it may happen that appliances using gaseous fuels put on the market, while satisfying the requirements of the relevant special directive, jeopardize safety; whereas it is necessary to lay down a procedure designed to lessen this danger;

Whereas in the Member States, different conditions as regards types of gas and fuel feed pressures are in force, and whereas these mandatory conditions cannot be harmonized in view of the fact that the energy supply and distribution situation is specific to each Member State,

HAS ADOPTED THIS DIRECTIVE:

CHAPTER I

Definitions and basic principles

Article 1

1. For the purposes of this Directive, "gas appliance" means:

   A) any appliance for cooking, heating, hot water production, refrigeration, lighting or washing;
   B) any safety and control device intended for these appliances; intended for use on land and capable of using gaseous fuels under the actual conditions of supply specified for the appliance.

2. For the purposes of this Directive and of the special directives; EEC-type gas appliance means any appliance manufactured so as to satisfy the provisions of the special directives for that category of gas appliance.

3. Model of the appliance means the gas appliance manufactured in mass production or representative of a mass production series.

Article 2

The Member States shall not prohibit or restrict, for reasons concerning construction and methods of inspection, the placing on the market, and may not refuse connection to the distribution network and the putting into service for a use conforming with its intended purpose, of a gas appliance of EEC corresponding to the requirements laid down in the relevant special directive, and has been inspected in accordance with the conditions laid down in this Directive and the relevant special directive.

Article 3

1. For each category of gas appliance the special directives shall specify the technical characteristics and the methods of inspection, testing and, where appropriate, operation.

2. They shall specify for the category of gas appliance concerned the conditions under which it is subject to EEC approval and EEC verification.

3. They may specify the date on which the national provisions conforming to the relevant special directive are to replace completely the national provisions previously applicable.

Article 4

The responsibility of the inspection authority, notified in accordance with Annex III section A of this Directive, which has carried out the inspection is limited to examination performed in accordance with the provisions of the directives relating to the gas appliance and to the tasks which are entrusted to that authority by these directives.

Article 5

The symbol CE imposted on the appliance in accordance with the conditions set out in the present directive testifies that that appliance meets the specifications of the present directive and the relative special directive.

Appliance bearing this symbol CE is not subject to frequent control.

CHAPTER II

EEC APPROVAL

Article 6

1. EEC approval shall constitute a preliminary step to EEC verification.

2. The inspection authorities shall grant, on applicaiton from the manufacturer or his agent domiciled in a Member State, EEC approval to any standard model, of a gas appliance which satisfies the technical provisions laid down in the special directive relating to that category of gas appliance.

3. Application for EEC approval of a given model of gas appliance may be submitted in only one Member State.

4. The inspection authorities shall follow the procedure for granting EEC approval in accordance with the provisions of this Chapter and of Sections 1 and 2 of Annex I.

Article 7

1. If the results of the exmination described in item 2 of Section 2 of Annex I are satisfactory, the inspection authority which has carried out this examination shall draw up an EEC approval certificate and forward it to the applicant. The latter shall affix the EEC approval mark on each mass-produced gas appliance manufactured in accordance with the model which has obtained EEC approval.

2. The provisions relating to the certificate, the EEC approval mark and the announcement of the EEC approval are set out in Sections 3 and 4 of Annex I.

3. The special directives may lay down that EEC approval is dependant on [illegible] certain conditions or limited in time.

4. The manufacturer shall inform the inspection authority when a model of an applience which has received EEC approval is put into mass production.

5. Any modification to a model of an appliance which has obtained EEC approval shall be the subject of a new application for approval, except where the modification does not affect one or more conditions or parameters used as a basis for the tests required for the granting of the approval.

   The inspection authority shall then carry out only those tests required for the granting of approval the results of which might be affected by the modification.

Article 8

1. The inspection authority which has granted EEC approval shall withdraw it if it finds that gas appliances the model of which has been the subject of approval:

   - do not conform to the model or to the provisions of the relevant special directive;
   - reveal a fault likely to jeopardize safety.

2. Withdrawal of EEC approval may be decided upon only by the inspection authority which granted it. This authority shall immediately inform the party concerned, the inspection authorities specified in the list supplied in accordance with Article 15, and the Commission.

CHAPTER III

EEC VERIFICATION

Article 9

1. The purpose of EEC verification is to check the conformity of gas appliances in mass production with the model which obtained approval.
2. The manufacturer shall apply every method judged to be useful in order to satisfy himself that the appliances made in mass production conform to the one which obtained approval and to the requirements of the relevant special directive.
3. Where an appliance conforming to the approved model has not been manufactured in the Community, the inspection authority of the Member State into which that appliance is imported from the country of origin shall subject each batch of appliances to an appropriate verification and an " " verification mark shall be affixed on each appliance.

Article 10

1. The manufacturer shall make available to the inspection authority the records, reports or any other information indicating that the gas appliances have been verified in accordance with Article 9.
2. The manufacturer shall not refuse the inspection authority access to the manufacturing premises if satisfactory execution of the task entrusted to this authority by the directives concerning the appliance requires such access.

Article 11

The special directives shall specify for the type of gas appliance in question the procedures to be followed by the inspection authority for EEC verification.

Article 12

1. The inspection authority shall, in accordance with Articles 10 and 11, be enabled to carry out any inspection judged to be necessaryiin order to satisfy itself that the verification carried out by the manufacturer is satisfactory.
2. If a special directive so requires, the inspection authority shall issue a certificate showing the inspection procedures carried out and their results.

Article 13

The special directives may lay down that appliances in mass production shall bear numbers enabling them to be identified.

CHAPTER IV

Provisions which are common to EEC approval and EEC verification

Article 14

Section A of Annex III sets out the criteria which the Member States must take into consideration in appointing the inspection authorities, the names of which are to be notified in accordance with Article 15.

Article 15

Each Member States shall communicate to the other Member States and the Commission a list of its inspection authority or authorities which are authorized to carry out inspection tasks, specifying whether such tasks are limited to the execution of certain inspection procedures; any subsequent amendment to this list shall likewise be communicated.

Article 16

The Member States shall take all necessary measures to prevent the use on gas appliances of marks or inscriptions liable to be confused with the EEC approval mark.

CHAPTER V

Adaptation of the directives to technical progress

Article 17

The amendments necessary to adapt Annexes I and II of this Directive in line with technical progress shall be made in accordance with the procedure laid down in Article 19.

The special directives relating to gas appliances within the meaning of Article 1 (1) shall specify which of the provisions of their technical annexes may be adapted by this procedure.

Article 18

1. A committee, hereinafter called the "Committee" is hereby set up to adapt to technical progress those directives which concern the removal of technical barriers to trade in gas appliances. It shall consist of representatives of the Member States with a representative of the Commission as Chairman.

2. The Committee shall adopt its own rules of procedure.

Article 19

1. Where the procedure laid down in this Article is to be followed, matters shall be referred to the Committee by the Chairman, either on his own initiative or at the request of the representative of a Member State.

2. The representative of the Commission shall submit to the Committee a draft of the measures to be adopted. The Committee shall deliver its opinion of the draft within a time limit set by the Chairman having regard to the urgency of the matter. Opinions shall be adopted by a majority of forty-one votes, the votes of Member States being weighted as provided in Article 148 (2) of the Treaty. The Chairman shall not vote.

3. a) The Commission shall adopt the measures envisaged where they are in accordance with the opinion of the Committee.

b) Where the measures envisaged are not in accordance with the opinion of the Committee, or if no opinion is adopted, the Commission shall without delay propose to the Council the measures to be adopted. The Council shall act by a qualified majority.

c) If, within three months of the proposal being submitted to it, the Council has not acted, the proposed measures shall be adopted by The Commission.

CHAPTER VI

DEROGATORY CLAUSE

Article 20

1. Where a Member State has detailed grounds for establishing that a product although satisfying the requirements of the Directive constitutes a hazard to safety it may provisionally prohibit the sale of that product or subject it to special conditions ruling in its territory. It shall immediately inform the Commission and the other Member States thereof and give the reasons for its decision.

2. The Commission shall, within six weeks, consult the Member States concerned before delivering its opinion forthwith and taking the appropriate steps.

3. Where the Commission is of the opinion that technical adaptations to the Directive are necessary, such adaptations shall be adopted by either the Commission or the Council under the procedure laid down in Article 19. In this event, the Member State having adopted safeguard measures may maintain them until such adaptations enter into force.

CHAPTER VII

PROVISION FOR BILATERAL TRADE

Article 21

1. For the categories of gas appliances referred to in Article 1 (1) which are not the subject of a special directive, the competent administrative authorities of the Member State into which the gas appliance is intended to be imported, placed on the market and put into service shall consider as conforming to the laws, regulations and administrative provisions in force in that State gas appliances which, in accordance with the procedure described in Annex IV, have been subjected to inspection and tests carried out by an inspection authority of the Member State from which the appliance originates, in accordance with the methods in force in the importing Member State or recognized as equivalent by the administrative authorities of that State.

2. Member States shall attach to the reports and certificates issued by the inspection authority of the State from which the gas appliance originates the same value as to corresponding national documents.

CHAPTER VIII

FINAL PROVISIONS

Article 22

1. Member States shall put into force the laws, regulations and administrative provisions needed in order to comply with this Directive within eighteen months of its notification and shall forthwith inform the Commission thereof.

2. Member States shall ensure that the texts of the provisions of national law which they adopt in the field covered by this Directive are communicated to the Commission.

Article 23

This Directive is addressed to the Member States.

ANNEX I

EEC APPROVAL

1. Application for EEC approval

1.1. The application and the correspondence relating to it shall be drawn up in an official language in accordance with the laws of the State to which the application is made. The inspection authority of this Member State has the right to require that the annexed documents shall also be written in the same official language.

The applicant shall send a copy of his application simultaneously to all the inspection authorities on the lists communicated in accordance with Article 15.

1.2. The application shall contain the following information:

- the name and address of the manufacturer or of this authorized representative or of the applicant who has his head office within the Community;
- the category of appliance;
- the intended use;
- the technical characteristics;
- the trade description, if any, or the type.

1.3. The application shall be accompanied by the documents necessary for its evaluation, in duplicate, and in particular:

1.3.1. A description in particular of:

- the specification of the materials, the methods of construction (the capacity of the appliance, the maximum gas flow rate, the type or calorific value of the gases which can be used, etc.);
- the safety devices and the controls for the gas flow rate, etc.;
- the intended locations for the conformity marking;
- the proper installation and use fo the appliance.

1.3.2. General arrangement drawings and, where necessary, detailed drawings of devices which are of importance from the safety viewpoint.

1.3.3. Any other information required by the special directives.

1.3.4. A declaration stating that no other application for approval has been submitted in respect of the same model of the appliance.

1.4. The application shall be accompanied, where appropriate, by documents relevant to the national approvals already granted.

2. Examination for EEC approval

2.1. The examination for EEC approval shall be carried out on the basis of the design and on the model of the appliance.

This exmination shall cover:

a) The manufacturing method employed and the execution of the work (techniques and materials used with the view to ensuring the safety of the appliance);

b) inspection of the safety and gas-flow control equipment and of the specifications for the mode of operation.

2.2. The special directives for the different categories of gas appliances shall specify in particular the field of application, the maximum permissible coefficients of gas leakage, the maximun concentrations of certain toxic products of combustion and where appropriate, the specifications for materials which may be used in the construction of parts subject to corrosion and fatigue, and the general methods used in the manufacture.

3. EEC-approval certificate and mark

3.1. The certificate shall give the results of the examination of the model and shall specify any other requirements which must be complied with. It shall be accompanied by descriptions, drawings and diagrams necessary to identify the model.

The approval mark provided for in Article 7 of this Directive shall be a stylized letter E containing:

- in the upper part, the distinguishing capital letter of the State which granted the approval (B for Belgium, D for the Federal Republic of Germany, DK for Denmark, F for France, I for Italy, IRL for Ireland, L for Luxembourg, NL for Holland, UK for the United Kingdom) and the last two digits of the year of approval;
- in the lower part, the distinguishing symbol of the authority which granted approval, followed by the identification number of the EEC approval.

3.2. Example of an EEC approval mark

D 73	EEC approval granted by the competent department of the Federal Republic of Germany in 1973 (see item 3.1., first indent.
.....	Distinguishing mark of the competent authority and identification number of the EEC approval (see item 3.1., second indent).

3.3. The special directives may define the positions and the dimensions of the EEC approval mark.

Unless otherwise stated in the special directives, the diameters of the circles used in the mark shall be 6.3 or 12.5 mm.

3.4. The approval mark affixed by the manufacturer on any appliance or ancillery device in accordance with the provisions of the Directive must be visible, legible and irremovable.

4. Announcement of approval

4.1. EEC approvals and withdrawals of EEC approval shall be published in a special Annex to the Official Journal of the European Communities.

4.2. At the same time as the party concerned is notified, copies of the EEC certificate of approval shall be sent to the Commission and to the other inspection authorities on the lists communicated in accordance with Article 15; the latter can also obtain copies of the reports of the examinations and tests if they wish.

4.3. Withdrawal of any EEC approval shall be notified to the party concerned, who shall receive a copy of the examination, and test reports, to the Commission and to the inspection authorities

on the lists communicated in accordance with Article 15.

4.4. Any inspection authority refusing to grant EEC approval shall inform the party concerned, who may obtain a copy of the examination and test reports, the inspection authorities on the lists communicated in accordance with Article 15, and the Commission.

ANNEX II

EEC VERIFICATION

1. General

1.1. The EEC verification may be carried out in one or more stages.

1.1.1. Subject to the provisions of any of the special directives:

- the EEC verification shall be carried out in a single stage on any appliance which is complete on leaving the factory, that is to say one which, theoretically, can be transferred to the place of installation without first having to be dismantled.
- The EEC verification shall be carried out in two or more stages for any appliance whose correct functioning depends on an assembly of several parts or devices.

1.1.2. The first stage of the verification procedure must ensure, in particular, that the appliance conforms to the approved model.

2. Scope of the EEC verification

In so far as the appropriate provisions are laid down in any special directive, EEC verification shall in particular include:

- an examination of the combustion quality of the envisaged gas supply;
- a check on the robustness and, if appropriate, on the method of construction and the workmanship;
- tests for leaktightness;
- measurement of the carbon monoxide content;
- an examination of the maximum temperatures reached under extreme conditions of use;
- the functioning of the safety and/or regulating devices;
- where applicable, a trial run.

Any special directive for particular categories of gas appliances may also lay down the minimum construction and assembly rules with which the appliances must comply.

ANNEX III

Criteria to be taken into consideration by Member States in appointing the inspection authorities empowered to grant EEC approval and to carry out EEC verification.

A) 1. No inspection authority, including its director and staff responsible for carrying out verification (tests and inspections) shall be the manufacturer, supplier or installer of any appliance or equipment under its inspection nor the agent or business associate of the aforenamed persons. Neither shall they sell, represent or service any such appliance or equipment nor act as agent for any person so doing.

2. The inspection authority shall perform the tasks entrusted to it for the purpose of complying with the requirements of this Directive and any other special directives in accordance with the highest standards of professional integrity and technical competence and it shall be under no commercial pressure likely to influence its technical judgement.

3. The inspection authority must have access to the equipment required for performing the routine inspection for which it is approved and also to the equipment required for non-routine verifications.

4. The inspection staff shall have:

   a) a satisfactory knowledge of the requirements relating to the inspections to be performed and sufficient practical experience thereof;

   b) the ability required for compiling the final inspection certificates, record sheets and reports which embody the results of the inspections carried out.

5. The independent status of the staff shall be ensured through sufficient guarantees of employment. Remunerations shall not be related to the financial results of the inspectorate or to the number of inspections.

6. The inspection authority shall be insured for civil liability through an unsurance policy with an adequate coverage.

7. The inspection authority shall treat as confidential all projects or documents forwarded to it by the manufacturer or his representative.

8. The inspection authority may delegate the execution of tests and verifications to competent laboratories on condition that it is certified that these laboratories meet the following criteria:

B. a) The laboratory shall perform every task entrusted to it for the purpose of complying with the requirements of this Directive and any special directives in accordance with the highest standards of professional integrity and technical competence and it shall be under no commercial pressure likely to influence its technical judgement.

b) The laboratory shall have access to the equipment necessary for performing every task entrusted to it.

c) The inspection staff shall have:

- a satisfactory knowledge of the requirements relating to the tests and verifications to be performed and sufficient practical experience thereof;
- the ability required for compiling the final inspection certificates, record sheets and reports, which embody the results of the inspections carried out.

d) The independent status of the staff shall be ensured through sufficient guarantees of employment.

e) The laboratory shall treat as confidential all projects or documents forwarded to it by the manufacturer or his representative.

ANNEX IV

Definations

State of origin: State of manufacture of the gas appliance.

State of destination: State of importation, sale or use of the gas appliance.

The competent administrative authorities of the State of origin shall hereinafter be designated "Administration of origin";

The competent administrative authorities of the state of destination shall hereinafter be designated "Administration of destination".

Procedure

1. Acting in accordance with Article 21 of this Directive, any manufacturer or his representative desiring to export one or more gas appliances of the same model shall apply to the Administration of destination, directly or through the importer in the state of destination, so that arrangements may be made for the verifications complying with the methods in force in the state of destination to be performed by one of the inspection authorities shown in the lists communicated in accordance with Article 15 of this Directive and which is located in the state of origin.

   The application shall be accompanied by drawings, calculations, materials specificaitons, manufacturing processes and the results of any verifications laid down therein together with any further information considered by the manufacturer or his representative as appropriate to enable the Administration of destination to assess the conformity of the proposal or proposals with the requirements in force in the state of destination.

   The documents shall be submitted in quadruplicate in the language of that state of destination or in any other language acceptable.

2. Within the two months from receiving the application, the Administration of destination shall simultaneously notify the Administration of origin and the applicant whether the drawings, calculations, specifications and manufacturing processes comply with the requirements in force within the state of destination or if not, whether it considers that it would nevertheless be possible to regard the proposed gas appliance or model therof as being acceptable. In the latter event, the Administration of destination shall state which are the tests and verifications that are stipulated by the regulations in force and shall appoint the inspection authority in the Member State of origin shown in the lists communicated in accordance with Article 15 of this Directive, which shall carry them out.

3. The approved inspection authority in the state of origin shall perform the operations requested by the Administration of destination or any other operations stated by the latter to be acceptable.

4. Any dues, taxes, fees or other charges incurred in performing the inspection and testing operations shall be those laid down by the rules customarily applied by that inspection authority.

5. After carrying out the tests and verifications requested by the Administration of destination, the inspection authority approved by the state of origin shall issue to the manufacturer or his representative and to the Administration of destination the appropriate reports and certificates showing that the tests and verifications have given satisfactory results and that the gas appliance or gas appliances of the same model have been verified in accordance with the methods in force in the state of destination or else approved by the Administration of destination.

6. Such inspection and test certificates shall have the same validity as though they had been issued by an inspection authority of the state of destination, allowing it automatically to affix its national symbol to the appropriate gas appliance or appliances.

7. The Administration of destination shall treat as confidential all projects or documents submitted by a manufacturer or his representative in accordance with the procedure laid down in this Annex.

Proposal for a Council Directive
on the approximation of the laws of the Member States relating
to gas appliances using gaseous fuels for instantaneous
production of hot water for sanitary purposes

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 100 thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Parliament,

Having regard to the Opinion of the Economic and Social Committee,

Whereas in the Member States the construction and inspection of gas appliances using gaseous fuels for instantaneous production of hot water for sanitary purposes are subject to mandatory provisions which differ from one Member State to another thus hindering trade in these appliances; whereas it is therefore necessary to approximate these provisions;

Whereas the Council Directive of ..... on the approximation of the laws of the Member States relating to provisions common to gas appliances using gaseous fuels for instantaneous production of hot water for sanitary purposes and to the methods of inspection for these appliances laid down in particular the EEC approval and EEC verification procedures for these appliances, whereas, in accordance with this Directive it is necessary to lay down the technical requirements with which EEC-type gas appliances using gaseous fuels for instantaneous production of hot water must comply in order that they may be distributed, marketed and used freely after having been subjected to inspection and had the marks and signs affixed to them;

Whereas that it is convenient, with a view to the mutual exchange of information that each Member State notifies to the Commission and to the other Member States the conditions under which families of gases and their supply pressures are defined within its territory.

HAS ADOPTED THIS DIRECTIVE :

CHAPTER I

Article 1

1. This Directive applies to appliances using gaseous fuels for instantaneous production of hot water for domestic and commercial use of the rated capacity defined in Section 3.5.3 of Annex I.

2. It specifies the main characteristics of these appliances, and the systems used for rendering them safe, connecting them up and controlling them. It also states the conditions to be fulfilled and the procedures for carrying out the requisite tests on EEC-type appliances and on their accessories.

3. The definitions employed in this Directive are given in Annex II.

Article 2

EEC-type appliances which bear the "CE" mark are appliances which provided with their safety and controlling devices, conform with the requirements of the Directive and its Annexes on the approximation of the laws of the Member States relating to appliances using gaseous fuels, to safety and gas-control devices intended for these appliances and to the methods of inspection of these appliances, and which comply with the specificaitons in the Annexes to this Directive.

Article 3

No Member States may for reasons concerning the construction, inspection connection to the gas distribution network or the putting into appropriate service, as defined in Article 4, refuse, prohibit or restrict the importation or placing on the market of a gas appliance of the EEC type bearing the "CE" approval sign inscribed with the marks indicating the category and the normal supply pressure or pressures in force in the importating country.

.../...

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Article 4

1. The putting of an appliance into appropriate service is compliance with the conditions laid down by each Member State in its territory, which relate only to

a) the categories of appliance marketed in the Member State;

b) the normal supply pressures of the various gas types distributed in the Member State.

2. Each Member State shall within six months of notification of this Directive notify the Commission and the other Member States of the conditions concerning sections (a) and (b) of paragraph 1 which must be satisfied in its territory.

3. The Member State shall inform the Commission and the other Member States eighteen months in advance of any amendments to the conditions notified in accordance with paragraph 2 of this Article.

Article 5

Appliances of the EEC type shall be submitted for EEC type approval and for EEC verification under the conditions specified in Annexes B and C to this Directive.

Article 6

The "CE" mark shall be affixed by the manufacturer, or by the person responsible for placing the appliance on the market on his own responsibility to each appliance conforming to a model which has been approved.

Article 7

An applicant for EEC approval is required to submit the documents specified in Annex B together with three appliances in the form of models which are completely representative of the mass-production series, and all other information required by the Member State where approval takes place which supplements the provisions of section 1 of Annex I to the Directive on the approximation of the laws of the Member States relating to appliances using gaseous fuels, to safety and control devices intended for these appliances and to the methods of inspection of these appliances.

Article 8

A manufacturer or his authorized agent who has obtained a certificate of EEC type approval is obliged, under penalty of withdrawal of approval, before commencing any mass production, to inform the inspection authority 30 days in advance of this intention in order to allow it to complete the necessary verifications laid down in Annex C to this Directive.

Article 9

Any amendments necessary to adapt Annexes I,II, III and IV to this Directive in line with technical progress shall be adopted in accordance with the procedure laid down in Articel 18 of the Council Directive on the approximation of the laws of the Member States relating to appliances using gaseous fuels, to safety and control devices intended for these appliances, and to the methods of inspection of these appliances.

Article 10

1. Without prejudice to the provisions laid down in the 2nd paragraph of art.4 the Member States shall put into force the laws, regulations or administrative provisions necessary to comply with this Directive within a period of eighteen months from their notification and shall forthwith inform the Commission thereof.

2. Member States shall ensure that the texts of the main provisions of national law which they adopt in the field covered by this Directive are communicated to the Commission.

Article 11

This Directive is addressed to the Member States.

C H A P T E R II

TECHNICAL ANNEX

ANNEX I

Materials and Construction

1.1. General

The quality and strength of the materials used in the construction of the appliance shall be such that the appliance shall withstand any mechanical shock to which it may be submitted to the extent that any such shock shall not provoke an escape of gas. Parts in contact with water shall be made of materials of such quality as will not cause contamination of the water, and the connecting materials must be adequate.

1.2. Resistance of materials to ageing

All thematerials shall be such that in the course of normal use no deterioration of the materials shall occur within a period of normal use of the appliance.

1.3. Resistance to heat

The materials used in the construction of the appliance shall not deteriorate as a result of the heating of the appliance while in use.

1.4. Protection against corrosion

Parts of the appliance which are not of themselves corrosion-resistant shall be stove-enamelled or otherwise rendered corrosion-resistant to the extent required by Sub-section 1.2.

Components

2.1. Burners

The section of the flame ports shall not be adjustable. When conversion from one gas to another is achieved by a change of injectors, they shall have indelible means of identification to avoid any confusion arising, preferably by marking the diameter, expressed in hundredths of a millimeter, on the injector.

Removal and replacement of the burners shall be possible without having to dismantle the major parts of the appliance. The burner position shall be fixed and so designed that it is not possible to put it in an incorrect position. In particular the burner shall be correctly centred in relation to the heating body and fixable only in this position.

An aerated burner shall be designed so that the section for the admission of primary air is not adjustable.

2.2. Gas taps

An appliance shall have a gas tap allowing manual interruption of the supply of gas to the burner and pilot. This device shall be so designed and positioned that it is easy to operate.

The various tap positions shall be marked indelibly and clearly as follows :

- off : disc
- pilot ignition position (if any) : stylised spark
- nominal rate (burners) : large stylised flame
- reduced rate (if present) : small stylised flame

Where a single control knob operates pilot flame and burner, no markings are required if incorrect operation is impossible.

If a tap handle operates by turning, it shall close in a clock-wise direction for an observer facing the handle.

A tap handle shall be designed and placed so that it can neither be assembled incorrectly nor operate spontaneously.

2.3. Flame failure devices

An appliance shall have a flame failure device, controlling the admission of gas to the main burner and possibly to any ignition pilot flame.

2.4. Ignition devices

Every appliance shall be provided with a pilot flame.

The ignition of a pilot flame on a type A or B appliance shall be easily lighted with a match or a special ignition device. For an appliance of type C, thegas supply to the pilot flame shall be separated from the gas supply to the burner. The pilot shall be positioned so that its products of combustion are evacuated with those of the burner. Whilst in operation, the relative position of the pilot and burner shall not change.

If the pilots differ according to the nature of the gas used, they shall be marked, easily substituted for each other and easily fitted. This applies also to injectors. If the injectors of the pilot need to be changed, they shall be marked easily substituted for each other and easily fitted.

The pilot jet shall be made of a material that will not deteriorate under normal conditions of use. The use of removable anti- dust device such as a filter is desirable.

Where there is no governor on the gas supply to the pilot, a means of adjusting the gas rate is mandatory for an appliance using 1st. family gas, optional for 2nd family gases, and prohibit for 3rd family gases. However it is also optional for 1st family gases when, at a pressure of 15 mbar, the pilot rate is less than 0.17 kW net CV or 0.187 kW gross CV with the reference Gas.

The adjuster may be omitted if the pilot and/or the injector adapted to the gas used can be easily changed.

For a sealed appliance of type C, a special ignition device shall be provided e.g. an electric igniter. It shall be possible to ignite the pilot of such an appliance when the combustion chamber is closed and only when the supply of gas to the burner is not possible.

2.5. Governors

- Appliances in categories II_{12}, II_{12HL}, II_{12L}, II_{12H}, and III shall have a governor.
- Appliances in categories I_{2HL}, I_{2H}, I_{2L}, II_{2HL3}, II_{2H3}, and II_{2L3}, may have a governor.
- Appliances in categories I_2, I_3, and II_{23} shall not have a governor.

It shall be possible to immobilize any governor for appliances in category II_{12} when supplied with 2nd family gases.

It shall be possible to immobilize any governor for appliances in categories II_{2HL3}, II_{2H3}, II_{2L3}, and III when supplied with 3rd family gases.

The design and accessibility of the governor shall be such that adjustment and immobilization for use with another gas can be done easily, but means shall be provided to prevent the user from interfering with the adjuster.

2.6. Water pressure limiters

To avoid deterioration caused by an excessive pressure increase in the water circuit, it shall be possible to fit the appliance, if necessary, with a water pressure safety device.

2.7. Water rate adjusters

The appliance shall be provided with a means for adjusting the water rate. This may be a temperature selector, especially if there is a water governor. If there are adjusting screws, they shall be positioned so that they cannot fall into the waterways, nor shall their threads deteriorate after several successive manipulations.

2.8. Automatic valves

The appliance shall include an automatic valve which cuts off the supply of gas to the burner when the flow of water through the appliance.

2.9. Ignition control device

The appliance shall be supplied with a device assuring smooth ignition of the burner but which does not prevent a sharp cutting-off of gas upon flame extinction.

2.10. Gas rate adjusters

Appliances in categories II_{12}, II_{12HL}, II_{12H}, II_{12L} and III shall have gas rate adjusters for the burners.

Appliances in categories I_{2HL} and II_{2HL3} may have a gas rate adjuster for the burners.

Appliances in categories I_2, I_{2H}, I_{2L}, I_3, II_{23}, II_{2H3} and II_{2L3} shall not have gas rate adjusters for the burners.

Moreover, for appliances in category III and for those in category II_{2HL3}, with a means of adjustment, it shall be possible to put the adjusters out of action when the appliances are supplied with a 3rd family gas, and for appliances in categories II_{12}, II_{12H} and II_{12L} when supplied with a 2nd family gas.

When an adjuster is in a sealed position it is considered as non-existent.

For an appliance with an adjustable governor, the governor is considered to carry out the function of a gas rate adjuster.

An injector shall have a non-adjustable orifice.

To facilitate the adjustment of burner rates, an appliance shall include two pressure test points ; one to measure the pressure at the inlet to the appliance and another immediately upstream of the burner. These pressure points shall have a maximum external diameter of 9 mm. It shall be possible to fix an flexible tube to the opening.

A gas rate adjuster shall be designed so that it is protected against accidental movement by the user after installation and in service ; it shall be possible to seal this device after adjustment.

An adjuster shall be made so that it can be easily manipulated after normal use over a prolonged period with no tools other than a screwdriver or spanner. Adjusting screws shall be located so that they cannot fall into the gasways, and their threads shall not deteriorate after several successive adjustments.

3. Construction

3.1. General

All the constituents shall be constructed and assembled in such a way that the construction and assembly will ensure that performance characteristics of the appliance shall not change to any appreciable extent during a period of normal utilisation over a reasonable period of life.

The construction shall be such that water of condensation shall not lodge in any parts of the appliance. It shall be possible to install an appliance intended to be fixed to a wall with appropriate means for fixing, such as clamps, hooks or screws.

3.2. Accessibility - Ease of maintenance - Dismantling and Re-assembly.

Appliances, with the exception of those of type C, shall be supplied with a case.

Where a case is provided, it shall protect at least the heating body and burner. Removable parts, e.g. the burner or the heating body, shall be dismountable with the appliance remaining in position using ordinary tools such as a screw-driver or spanner.

It shall not be possible to replace parts which are removable for maintenance in a way that could impair the safe performance of the appliance. It shall be possible to clean without difficulty the combustion chamber and walls in contact with the products of combustion.

3.3. Gas and Water Connections

3.3.1. General requirements

It shall be possible to connect an appliance to supply pipes which are vertical or horizontal and are parallel to or perpendicular to the wall to which the appliance is to be fixed. The distance of the connection point from the wall shall be sufficient to allow the connection to be made using ordinary tools.

Gas and water connections shall be situated at the base of an appliance. The cold water connection for a small water heater shall be as required in the country in which the heater will be used. For a large water heater the cold water inlet shall be on the right and the hot water outlet on the left for an observer facing the appliance and the gas inlet shall be in between.

If an appliance has two draw-off taps, the hot water tap (marked in red) shall be placed on the left and the cold water tap (marked in blue) on the right of an observer facing the appliance.

3.3.2. Gas Connections

The gas inlet connections shall be rigid and not flexible. Where the inlet connection is threaded in accordance with ISO/R 228 : 1961, the end of the inlet connection shall be sufficiently flat to allow the use of a washer for sealing. The gas connection thread sizes shall be as set out in Table I, depending on the sizes of water heater.

TABLE 1. GAS CONNECTION THREAD AND COPPER TUBE SIZES

	Usual size of thread and tubes (definitions are given in ISO/R 228-1961 or ISO/R 7 - 1954)					
	Categories II_{12}, II_{12HL} II_{12H}, II_{12L} and III			Cat. I_2, I_{2HL}, I_{2L}, I_{2H}, II_{23} II_{2HL3}, II_{2H3} and II_{2L3}		
	Thread	Tube (mm) Diameter	Thickness	Thread	Tube (mm) Diameter	Thickness
small water heater 7,8 kW to 8,7 kW		15	0.7		15	0.7
large water heater 15,7 kW to 19,2 kW	3/4	22	0.9	1/2	15	0.7
20,4 kW to 25 kW	1	22	0.9	1/2	15	0.7
25,1 kW to 30,7 kW	1	22	0.9	3/4	15	0.9

For category I_3 appliances it shall be possible to cnnnect the appliance either by a compression union, a conical joint or a flat joint using pipe of internal diameter 6 mm and external diameter 8 mm for small water heaters and internal diameter 10 mm and external diameter 12 mm for large water heaters.

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If the inlet connection is a straight copper tube, it shall be at least 5 cm long and shall conform to the dimensions given in Table I as defined in ISO/R 274 : 1962 - Copper tubes of circular sections - Dimensions Metric Series.

3.3.3. Water connections

Water connections may be made by threaded steel tubing or by smooth copper tubing. In the latter case the tube shall be straight for at least 5 cm of its length and shall conform to the requirements set out in Table 2 for the size of heater. Screw threads on the pipes of water connections shall conform to the requirements given in Table 2 for the size of heater.

TABLE 2. WATER CONNECTION THREAD AND COPPER TUBE SIZES

	water connections	designation of connections (see ISO/R 228 - 1961)		
		Thread	Tube sizes	
			Diam.	Thickness
small water heater 7,8 kW to 8,7 kW	inlet connection		15	0.7
	any additional outlet connection	3/8	12	0.6
large water heater 15,7 kW to 19,2 kW 20,4 kW to 25 kW 25,1 kW to 30,7 kW	inlet connection	1/2	15	0.7
	outlet connection	1/2	15	0.7

If an appliance has two draw-off taps, the hot water tap (marked in red) shall be placed on the left and the cold water tap (marked in blue) on the right of the appliance looking at the front face.

Note : A low pressure appliance with an output of 22.7 kW or 27.9 kW may be supplied with a 3/4 size connection and a copper tube 22 mm diameter and 0.9 mm thickness.

3.4. Sealing

Holes for screws, nuts, etc., intended for the assembly of parts shall not open into gasways, and water shall not penetrate into them.

Parts of the gas circuit which are likely to be removed during normal user maintenance shall be connected by means of mechanical joints without the use of sealing compound, e.g., by metal to metal or by O-ring seals. The soundness shall be maintained after disconnections and re-connections. However, sealing compounds may be used for permanent assemblies provided that the temperature of the material does not exceed 100° C while the appliance is in use.

The sealing materials shall remain effective under normal conditions of appliance use. Soft solder shall not be used to ensure soundness of the gas circuit after assembly.

The soundness of type A appliances converted to type B and of type B appliances up to the draught diverter shall be effected only by mechanical means.

For type C appliances the soundness of the heating body and on the connection of an appliance to the combustion air inlet and products outlet ducts (type C_1) or to the common duct (type C_2) shall be effected by mechanical means only, except for the fixed parts within the common duct (type C_2).

Those parts of the assembly which do not require to be dismantled for routine maintenance may be joined with mastic or paste in such a way that soundness is assured in continuous service under normal conditions.

3.5. Supply of combustion air and evacuation of products of combustion

3.5.1. General

The cross-sections of the air inlet and combustion products outlet shall not be adjustable. All appliances shall be so designed that the supply of combustion air is assured during normal conditions of use and maintenance.

3.5.2. Unflued appliances (type A)

Only a small water heater may be of this type and it shall be fitted it with a deflector to direct the products of combustion away from the wall against which the appliance is installed. It shall also be possible to fit it with a draught-diverter for connection to a flue under the conditions of clause 3.4. In such an event it becomes a type B appliance. Both the deflector and draught-diverter shall be supplied to the laboratory for tests, but an appliance may be sold to the user with only one of them.

The orifices intended for the evacuation of the products of combustion shall be designed and arranged so that they cannot be obstructed by a pan or similar object.

3.5.3. Type B appliance (flued) including type A appliance transformed in to type B

A flued appliance shall have a draught-diverter as an integral part of the appliance placed either inside or outside the case.

The flue socket of the draught-diverter shall be female and shall allow the connection of a flue pipe having a diameter conforming to the requirements of the standards in force in the country where the appliance is to be installed ; however, the diameter of the flue pipe concerned shall be not less than

83 mm for small water heaters of nominal useful output of 7,8 kW to 8,7 kW

110 mm for large water heaters of nominal useful output of 15,7 kW to 19,2 kW

125 mm for large water heaters of nominal useful output of (20,4 kW to 25 kW
(25,1 kW to 30,7 kW

The manufacturer may provide a special adapter to allow this connection to be made.

The flue socket shall permit the flue pipe to be inserted to at least 15 mm. At maximum insertion the evacuation of the products of combustion shall not be impaired.

3.5.4. Type C_1 appliances (for connection to a balanced flue)

The assembly of the various parts shall be such that no work is necessary other than the adaption of the length of the ducts for the air intake and combustion products outlet to the thickness of the wall. It shall be possible to connect these ducts to an appliance using ordinary tools, if necessary.

For the installations of an appliance with an output of 30,7 kW and less it shall be possible to install the connecting parts to the terminal in an opening in the wall of width 350 mm and height 350 mm.

The external surfaces of the terminal shall have no openings which would permit the introduction of a 16 mm diameter ball into the ducts. It shall not be possible to see the flames through the terminal. All the necessary connecting parts and fitting instructions shall be supplied by themanufacturer.

3.5.5. Type C_2 appliance (for connection to a common duct)

The width of the orifices for combustion air and products of combustion measured horizontally shall not exceed 300 mm for an appliance with an output of 30,7 kW and less.

An appliance shall be designed so that it is possible to obtain the extension lengths specified by the manufacturer, for the end of the combustion air and combustion products duct into the common duct, whatever the total thickness (flue and cladding) of the common duct.

3.6. Flame visibility

All appliances shall be designed so that ignition, correct burner performance and the lenght of the pilot flame, can always be easily seen. This visibility shall be assured at all times and, where there is a viewing window, this shall not deteriorate under the affect of heat.

3.7. Drainage

All appliances shall have a means of easy drainage when required. The device shall be operable without any tool other than a screw-driver or spanner.

3.8. Conversion of appliances for use with different gases

The operations listed in the following table shall be possible without disconnecting the appliance.

TABLE 3.

Category	Change of Category	Necessary Modifications to the appliance
I	None possible	———
I_2	None possible	———
I_{2H}	None possible	———
I_{2L}	None possible	———

Category	Change of Category	Necessary Modifications to the appliance
I_{2HL}	H to L or L to H	1) modification of the burner regulator setting ; and 2) if necessary, a change of injector ; and 3) if necessary, a change in supply pressure at the intake of the appliance
I_3	From one pressure couple to another (e.g. 28/37 mbar, 50/67 mbar)	Change of injectors or of restrictor
II_{12}	1st family to 2nd family or vice-versa	1) adjustment of the gas rate with, if necessary a change of injectors or restrictors ; and 2) adjustment of the gas rate of ignition pilots or safety devices, either by a change of injectors or calibrated orifices and, if necessary, complete change of pilot, ignition burners, filament, ignition device, or of some of their parts ; and 3) immobilization of the governor mandatory

Category	Change of Category	Necessary Modifications
II_{12HL} II_{12H} II_{12L}	1st family to 2nd family or vice-versa or from Group H to Group L of 2nd family or vice-versa or from 1st family to Group H of 2nd family or vice-versa or from 1st family to to Group L of 2nd family or vice-versa	1) adjustment of the gas rate with, if necessary, a change of injectors or restrictors ; and 2) adjustment of the gas rate of ignition pilots or safety devices, either by a change of injectors or calibrated orifices and, if necessary, complete change of pilot, ignition burners, filament ignition device, or of some of their parts ; and 3) immobilization of the governor optional
II_{23} II_{2HL3} II_{2H3} II_{2L3}	change from - 2nd family to 3rd family and vice-versa - from Group H to Group L or vice-versa in the case of II_{2HL3} appliances or - from one LPG pressure couple to another (e.g. 28/37, 50/67 mbar)	1) changes of injectors or restrictors 2) change of pilot injector and calibrated orifices 3) if necessary, complete change of pilot, of ignition burners, of filament ignition devices, or of some of their parts. 4) For conversion to 3rd family gases, immobilization of the governor and of the burner and pilot gas rate adjusters, where present, and, if necessary, change of the automatic valve. 5) For category II_{2HL3} appliances adjustments of the burner and pilot gas rate by the appropriate adjusters are acceptable for 2nd family gases.

Category	Change of Category	Necessary Modifications
III	change from gas of any family to gas of another : - in the 1st and 2nd families from one group to another ; - in the 3rd family from one pressure couple to another (e.g. 28/37, 50/67 mbar)	1) adjustment of gas rate 2) if necessary, change of injectors or restrictors 3) adjustment of the gas rate of safety ignition pilots either by an adjuster or by a change of injectors or calibrated orifices. 4) if necessary, complete change of pilot, of ignition burners, of filament ignition devices or of some of their parts 5) immobilization of the governor mandatory for 3rd family gases, but optional for 2nd family gases 6) for 3rd family gases, immobilization of the pilot and burner gas rate adjusters were present.

PERFORMANCE REQUIREMENTS AND TESTS

4.1. Soundness

4.1.1. Soundness of gas circuit

Requirements

The appliance, when tested under the conditions described below, shall comply with thefollowing :

i) The gas leakage, when the gas tap is closed, shall not exceed 0.07 dm^3/h ;

ii) The gas leakage, when the gas tap is open and the gas valve, controlled by the automatic valve on the water circuit, is closed, shall not exceed that observed with the gas tap closed, by more than 0.07 dm^3/h ;

iii) The gas leakage, when the gas tap and the gas valve of the automatic valve are open and the valve on the flame failure device is closed, shall not exceed that observed with the gas tap closed, by more than 0.07 dm^3/h.

Tests

The tests shall be carried out at ambient temperature.

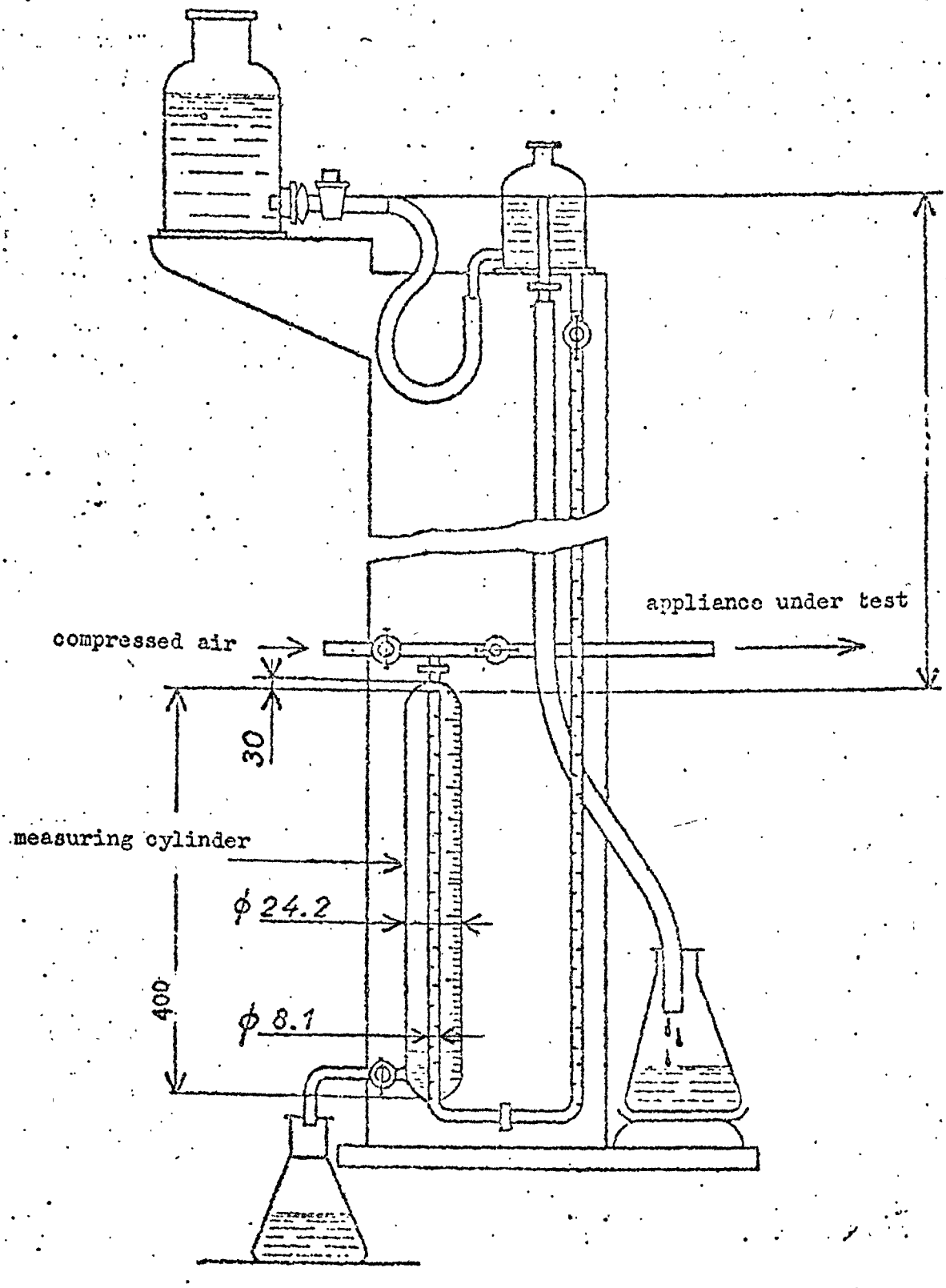
Test (i) shall be made at a pressure of 150 mbar. (Pressures referred to are those upstream of the appliance). Tests (ii) and (i shall be made at 50 mbar for appliance using 1st and 2nd family gases and at 150 mbar for appliances using 3rd family gases.

However, for appliances using third family gases, if a 112 mbar/ 148 mbar pressure couple is used the soundness tests shall be carried out at a pressure of 220 mbar. Any governor on an appliance designed to use 3rd family gases shall be locked in its maximum open position to avoid damaging it.

In test (ii), to check the soundness of the automatic valve the pilot supply shall be blocked.

FIGURE 1

Apparatus for testing appliance soundness



Dimensions are in millimetres

In test (iii), to check the soundness of the flame failure device the pilot supply shall be blocked when the gas to the pilot is not controlled by the device.

A volumetric method, such as that shown diagrammatically in figure 1, which allows a direct measurement of the leakage to an accuracy of 0.01 dm^3/h shall be used to determine any leak. Before each reading at least five minutes shall be allowed for thermal equilibrium to be reached.

The tests shall be the first carried out when the appliance is delivered for testing (the taps having been greased by the manufacturer), the test shall be repeated after all the other appliance tests have been carried out, but before dismantling any of the parts involved in the soundness tests.

4.1.2. Soundness of combustion circuit and evacuation of combustion products

4.1.2.1 Type B appliances

Requirement

Products of combustion shall escape only at the outlet of the flue to which the appliance is connected.

Test

This shall be tested by connecting the flue socket to a vertical flue 0.5 m long having a diameter equal to the minimum diameter prescribed in Clause 3.5.3 and with walls less than 1 mm thick. Tests shall be carried out in still air and in natural draught conditions using the reference gas and with the appliance adjusted to its nominal rate. Possible leaks shall be detected with a dew-point plate (its temperature is maintained slightly above the dew-point at ambient temperature), which shall be brought near all those points where a leak is suspected. In doubtful cases, however, leaks shall be sought by using a sampling probe connected to an infra-red carbon dioxide analyser capable of detecting CO_2 contents of the order of 0.1 %.

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4.1.2.2. Type C appliances

Requirement

The volume of leakage at 15° C and 1,013 mbar (regardless of air humidity) when determined under the conditions given below shall not exceed -

1.5 m^3/h for a small water heater,
3.0 m^3/h for a large water heater.

Test

For type C_1 appliances, soundness shall be checked on the appliance body and on the connections of the balanced flue supplied by the manufacturer. For the test the appliance shall be connected to a source of compressed air in such a way as to maintain a relative pressure of 0.5 mbar at the point where the compressed air is connected to the appliance. It shall be set up so that any possible leak due to a defect in the soundness of the appliance is evident. Leakage rate shall be measured by a meter.

For type C_2 appliances, a duct shall be used, one face having the thickness and characteristics of an actual duct. The apparatus shall be connected to this face according to the manufacturer's instructions. The whole shall be made sound and then connected to a source of compressed air so as to maintain a relative pressure of 0.5 mbar throughout the test. It shall be set up so that any possible leak at the connection of the appliance to the common duct is evident. Leakage rate shall be measured by a meter.

4.1.3. Soundness of water circuit

Requirement

The water circuit shall withstand a water pressure controlled by a manometer of :

0.5 bar for inlet control appliances
4.0 bar for low pressure appliances
15.0 bar for normal pressure appliances
20.0 bar for high pressure appliances

for a period of 15 minutes without showing signs of water leak or permanent distortion of the appliance.

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Test

In the test, the control barometer shall give the test pressure to an accuracy of within 2 %.

4.1.4. Durability of sealing materials

Requirements

A sealing product for an appliance for use with third family gases, in the test conditions described below, shall show no loss of weight exceeding 5 % of the initial weight of the sample, and its permeability, both at the commencement of test and after accelerated ageing, shall be nil. Its Figure A hardness shall not have varied by more than five units after accelerated ageing.

Tests

An Extraction test shall be made on materials likely to be affected by third family gases. In the test, the material shall be weighed and immersed in liquid pentane for 24 hours.

The material shall be removed from the pentane and kept for 24 hours in free air. The change in weight of a sample shall then be determined.

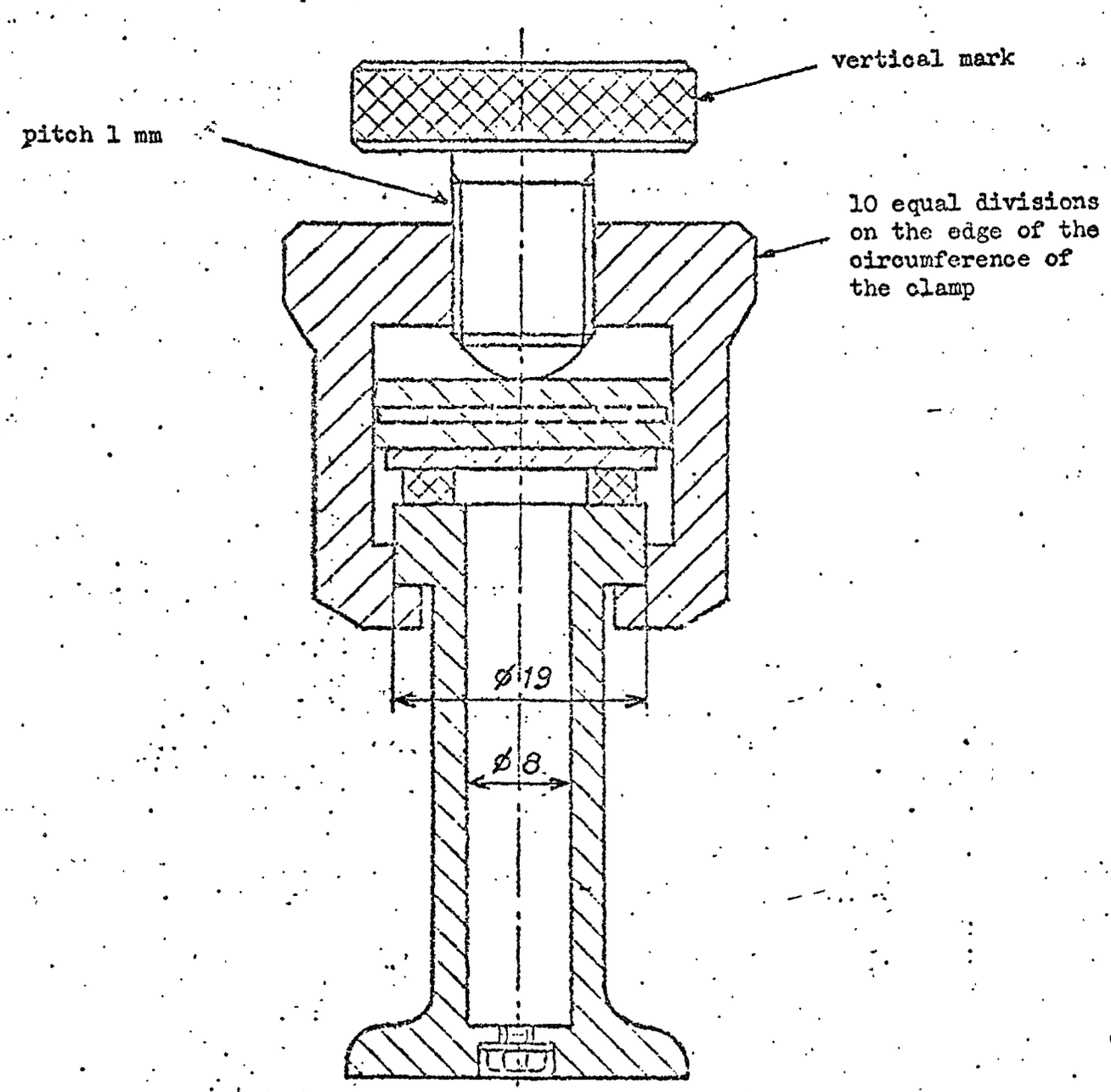
In the permeability test a gasket, 8 mm internal diameter and 19 mm external diameter shall be cut from a sheet of the material to be tested.

The gasket is compressed according to the suppliers instructions but not more than 20 % of its thickness in the device shown in figure 2, which has been previously filled with approximately 0.5 g of liquid pentane. The whole is weighed and kept in free air at 20°C ± 1°C.

The whole device is reweighed 24 hours later and the permeability in g/h of pentane is determined to the third decimal place.
A permeability test after accelerated ageing shall be made after testing above. The device still fitted with the sample gasket but emptied of its pentane, is placed in an oven held at a temperature of 110°C ± 1°C for 7 days.

FIGURE 2

Device for testing durability of methods of sealing



Dimensions are in millimetres

After this interval a second permeability test is carried out under the same conditions as described above.
The Shore A hardness of the material shall be determined in accordance with the ISO/R 868-1968. The material shall then be kept in an oven at a temperature of 110° C ± 1° C and the Shore A hardness redetermined.

4.2. Nominal gas rate and nominal output

Requirements

Appliances without a gas rate adjuster

When tested as described below the gas rate expressed in terms of the mass or volume of the test gas at reference conditions shall be not greater than 1.05 times the nominal gas rate expressed in the same terms, (mass or volume), and the useful heat output measured shall be not less than 0.95 times the nominal heat output.

Ungoverned appliances with a gas rate adjuster, where the appliance is designed for use with second family gases and where the gas rate adjuster is not immobilized for those gases.

When tested as described below, the observed gas rate for the appliances, measured with the adjuster fully opened and the supply pressure at the relevant normal test pressure for the test gas used, shall be greater than or equal to the nominal gas rate, and theobserved gas rate, measured with the adjuster in the minimum opened position and the supply pressure at the relevant maximum test pressure for the gas used, shall not exceed the nominal gas rate.

Governed appliances with a gas rate adjuster

The gas volume rate of a governed appliance when tested as described below, shall not be greater than 7.5 % above or 10 % below the gas volume rate to which the appliance is adjusted in the test for 1st family gases and for 2nd family gases shall not vary by more than ± 5 % for the gas volume rate to which the appliance is adjusted in the test,

the pressure upstream varying between the minimum and maximum limits given in Annex 4 for the reference gases of the appliance category in question.

Tests

Verification of nominal gas rate and nominal output

The gas rate may be expressed under reference conditions either as a mass rate (Kg/h) or volume rate (m^3/h) and may be based on the gross calorific value or on the net calorific value of the gas.

The nominal gas (mass) rate in Kg/h, at gross or net calorific value, shall be calculated by dividing the nominal heat input by the calorific value (gross or net, respectively) of the reference test gas. The nominal gas (volume) rate in cubic meters per hour at gross or net calorific value shall be calculated by dividing the nominal heat input by the appropriate calorific value of the reference test gas.

The appliance shall be tested using the appropriate reference gas at the pressure prescribed fot the test gas in Annex 4.4. The gas rate in Kg/h (M) or M^3/h (V) shall be measured by means of a conventional gas meter with the appliance at thermal equilibrium, the water supply conditions being such that the automatic valve is in the fully open position, and the water rate adjusted to the normal water rate.

From the result, the nominal gas mass rate (M) or volume rate (V) at ambient conditions shall be calculated.

The gas (mass) rate at reference conditions (M_o) shall be calculated from the measured gas mass rate (M) by the formula :

$$M_o = M \sqrt{\frac{1013 + P_i}{P_a + P_i}} \times \frac{273 + t_g}{288} \times \frac{d_r}{d}$$

or from the measured gas volume rate by the formula

$$M_o = M \cdot \frac{P_a + P_c}{P_a + P_i} \sqrt{\frac{1013 + P_i}{1030}} \times \frac{273 + t_g}{288} \times \frac{d_r}{d}$$

The gas (volume) rate at the reference conditions (V_o) shall be calculated from the measured gas volume rate V by the following formula :

$$V_o = V \cdot \frac{P_a + P_c}{P_a + P_i} \sqrt{\frac{1013 + P_i}{1013} \times \frac{P_a + P_i}{1013} \times \frac{288}{273+t_g} \times \frac{d}{d_r}}$$

In the above formulae,

M_o is the mass rate in reference conditions

M is the mass rate obtained under test conditions

V_o is the volume rate in reference conditions

V is the volume rate obtained under test conditions

P_a is the atmospheric pressure in mbar

P_i is the pressure upstream of the injector in mbar i.e. the prescribed test pressure

P_c is the gas supply pressure at the gas meter in mbar

t_g is the measured ambient temperature in °C

d is the relative density of dry gas

d_r is the relative density of reference gas

The values of the gas muss rate (M_o) or gas value rate (V_o) shall be compared with the corresponding calculated value.

4.3. Adjustment of water rate

4.3.1. Normal pressure and high pressure appliances without water governor or temperature selector

When tested under the conditions described below, the water rate adjuster shall allow the appliance to be adjusted to its nominal water rate under a water pressure of not more than 2 bar, measured at the cold water inlet connection of the appliance.

At a water supply pressure of 6 bar at nominal heat input, it shall be possible to adjust the appliance to a water rate corresponding to temperature rise of at least 50 °C.

When the supply pressure is decreased, starting from 0.6 bar at nominal heat input, the water temperature rise, determined as described below shall not exceed 75 °C.

Test

To determine the maximum temperature rise the appliance shall be adjusted at nominal water rate, and the gas pressure at the burner measured.

The inlet water pressure shall then be decreased until the gas pressure of the burner is 95 % of the initial pressure. The quantity of water flowing in unit time given is weighed, and the temperature rise corrisponding to a gas rate of 0.975 times the nominal rate shall be calculated.

4.3.2. Normal pressure and high pressure appliances with water governor and temperature selector

When tested under the conditions described below, when the temperature selector is adjusted to its minimum water rate setting at an inlet water pressure of 0.5 bar, the gas volume rate shall be at least equal to 95 % of the nominal gas volume rate.

In the range of pressure 0.6 bar to 6 bar, the water rate shall be not less than that corresponding to at temperature rise of 50 °C. When the water pressure is decreased, starting from 0.6 bar, the water rate shall remain greater than that corrisponding to a rise of temperature of 75 °C. When the temperature selector is adjusted to give the the maximum rate and the pressure is varied from 2 bar to 6 bar, the water rate shall remain higher than that corrisponding to a temperature rise of 50 °C.

Test

The maximum variation of the water rate relative to the mean rate shall be as given in Table 4.

The time shall be measured from the moment that gas reaches the main burner until the equilibrium temperature has risen by 90 % of the the temperature rise at thermal equilibrium.

TABLE 4. MAXIMUM VARIATION PERMITTED FOR THE WATER RATE RELATIVE TO THE MEAN RATE

condi-tions	Adjustment of selector so as to obtain :	Range of water pressure (in bar)	Values obtained for the water rate	Maximum vari-ation permit-ed for the water rate (x)
N° 1	minimum water rate(selector against the stop)	from 0.6 to 6	minimum maximum mean	± 10 %
N° 2	minimum water rate(selector against the stop)	from 6 to 10	minimum maximum mean	± 20 %
N° 3	maximum water rate (corresponding to a temperat. rise of 30° C at a pressure of 2 bar)	from 2 to 6	minimum maximum mean	± 10 %
N° 4	maximum water rate (corresponding to a temperat. rise of 30° C at a pressure of 2 bar)	from 6 to 10	minimum maximum mean	± 20 %

(x) The maximum variations for each test given in Table 4 shall be obtained by taking the difference between the minimum and maximum values observed during the course of the test and the mean value calculated by taking the arithmetic mean between the minimum and maximum values. These variations shall be expressed in percentages relative to the mean value.

4.3.3. Low pressure appliances

Requirements

The requirements of clause 4.3.1 and 4.3.2 shall apply as appropriate to low pressure appliances at the nominal and maximum water pressure stated by the manufacturer. Under those conditions the maximum water temperature rise shall not exceed 75° C. However, should the water inlet temperature exceed 20° C, the maximum rise shall not exceed 70° C.

Test

The above conditions shall be verified by measuring the water pressure at the cold water inlet connection of the appliance.

The maximum temperature rise at the water pressure falls shall be determined as follows : the appliance is adjusted at nominal rate, and the pressure at the burner is measured. The water pressure is then decreased upstream until the gas pressure at the burner is 95 % of the initial pressure. The quantity of water flowing in unit time is weighed and the temperature rise corresponding to a gas rate 0.975 times the nominal rate is calculated.

4.4. Automatic valves

Requirements

4.4.1. Automatic valves on normal pressure appliances

An automatic valve shall function correctly under a minimum inlet water pressure of 0.5 bar ; at this water pressure the gas rate shall be at least equal to 95 % of the nominal gas rate.

4.4.2. Automatic valves on low pressure appliances

An automatic valve shall function correctly at the minimum inlet water pressure stated by the manufacturer, and shall function correctly up to a pressure of 2.5 bar. At the minimum water pressure the gas rate shall be at least 95 % of the nominal gas rate and the performance of the valve shall remain correct up to a pressure of 2.5 bar.

Test

The appliance is previously adjusted to its nominal volume rate with reference gas at normal test pressure.

This adjustment is made for a water pressure of 2 bar measured at the inlet connection to the appliance for normal pressure appliances, and the normal pressure stated by the manufacturer for a low pressure appliance.

The water pressure is then lowered to 0.5 bar for normal pressure appliances and to the minimum pressure stated by the manufacturer for a low pressure appliance and it is verified that the gas rate satisfie the requirements stated above.

4.5. Effiency

Requirement

The efficiency, when determined under normal conditions of products evacuation as described below, shall be

not less than 80 % and not more than 88 %, based on net calorific value, or not less than 72 % and not more than 79 %, based on gross calorific value.

The efficiency value determined under the special conditions of products evacuation of type C appliance described below

- For C_1 appliance shall be not less than 0.9 times the efficiency under normal conditions of products evacuation
- For C_2 appliance shall be not less than 78 % on net CV or not less than 70 % on gross CV.

The conditions under which the efficiency test are carried out shall be as follows :

(i) The appliance is supplied with the reference gas and adjusted to give the nominal heat input ; the water rate is adjusted so that the inlet water temperature is below 25 °C and does not vary by more than ± 0.5 °C during the test, the temperature rise of the water being 40 °C ± 1 °C for all appliances, whatever their output.

(ii) The water temperatures are measured at a position immediately above the inlet connection and immediately below the outlet connection, every precaution being taken to ensure that the measuring device does not cause any thermal loss. The measurements are taken after the appliance has reached thermal equilibrium.

FIRST TEST

A test is first carried out in normal conditions in which Type A appliances (small water heaters) are fitted with a deflector, Type B appliances are fitted with a 0.5 m high flue, and type C appliances mounted as described in clause 5.4 below for calm and in non polluted air (all dampers open and the fan immobilized).

SECOND TEST

The test is then carried out under special flueing conditions. Appliances of type C_1 are mounted as described in article 5.4.3 and submitted to a wind of 5 m/s directed perpendiculary to the test wall. Type C_2 appliances are installed under the conditions described in clause 5.4.4 with an average upflow of 1.5 m/s and a CO_2 content of less than 0.5 %. A diagram of the apparatus as set up for testing, is shown in figure 3. To obtain these conditions, the fan should be started to provide up-draught, dampers F, C and E being open, and damper B closed. The air flow shall be regulated by means of dampers A and D.

The efficiency n of appliances using 1st and 2nd family gases shall be calculated by the formula :

$$n = \frac{m \times C_p \times \Delta t}{V \times I_p \text{ (or } P_p)} \times 100\ \%$$

or

The efficiency of appliances using 3rd family gases shall be calculated from the formula :

$$n = \frac{m \times C_p \times \Delta t}{M \times I_p \text{ (or } P_p)} \times 100\ \%$$

where

m is the mass of water collected during the test and expressed in kg

C_p is 4.186×10^{-3} in MJ/kg° C

Δt is the temperature rise of this water expressed in °C

V is the volume of gas (1st and 2nd families) consumed by the appliance during the test corrected to reference conditions and expressed in m^3

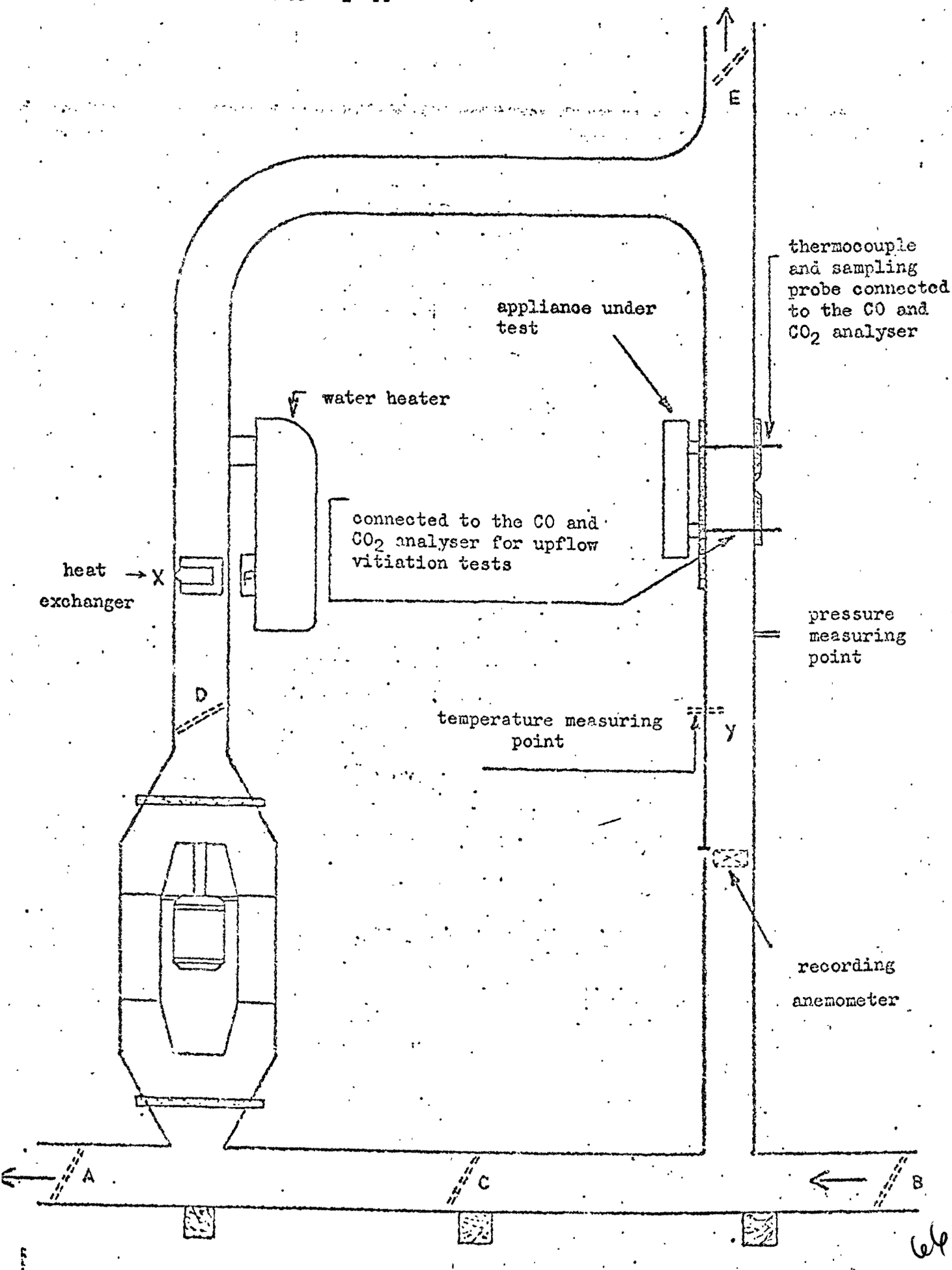
M is the quantity of gas (3rd family) consumed by the appliance during the test and expressed in kg

I_p is the net CV of the gas expressed in MJ/m^3

P_p is the gross CV of the gas expressed in MJ/m^3

FIGURE 3

Test of an appliance mounted on a common duct
(type C_2 appliance)



4.6. Prolonged performance

Requirements

The appliance shall be subjected to the prolonged performance test described below. After this test, the appliance shall comply with the following requirements :

The carbon monoxide content, determined in accordance with clause 5.9, shall be not more than 0.1 % when the appliance is supplied with the reference gas.

The appliance efficiency determined in accordance with clause 4.5, shall not have decreased by more than 5 points (e.g. 80 % instead of 85 % on net C.V.).

The burner rate shall not have varied by more than 5 % with the adjusters in their original positions. The tap operation shall remain easy and effective. The performance of the governor, flame-failure device and automatic valve shall meet the requirements of clauses 5.7, 5.5 and 4.4.

The appliance shall comply with the requirements for soundness, given in clauses 4.11 and 4.1.2.

Test

The tests shall be carried out with the reference gas and with water of hardness less than 25 degrees to avoid scaling (1 degree hardness = 10 mg of $CaCO_3/dm^3$).

The appliance shall be installed under the conditions defined in clause 5.9.2 and adjusted to the water rate corresponding to an outlet temperature of 60° C and to the nominal heat input, and a series of ignitions and extinctions shall be induced by an automatic water valve.

The length of each cycle shall be 8 minutes with an operation period of 4 minutes and a rest period of 4 minutes.

The test shall be carried out for 200 hours, i.e. 1500 cycles.

4.7. Time for temperature rise

Requirement

When the appliance is tested as described below at the normal gas rate and adjusted to give a temperature rise of 50° C between the water inlet and outlet, the time required to achieve 90 % of this temperature rise shall not exceed 25 seconds for a small water heater and 35 seconds for a large water heater.

Test

The appliance shall be adjusted and tested under the conditions defined in clause 4.5. The outlet water temperature shall be measured with a rapid indicating thermometer. The ambient temperature shall be higher than the inlet water temperature ; both shall be recorded in the test report.

The water rate shall be adjusted so that the temperature rise, with the appliance at thermal equilibrium, is 50° C for the nominal heat input. When this equilibrium has been reached, the gas applied to the burner shall be cut off, but without modifying the water rate. As soon as the outlet temperature becomes approximately the same as the inlet water temperature, the gas tap to the burner shall be re-opened and the pilot re-lit if necessary.

The time shall be measured from the moment the gas reaches the main burner until the equilibrium temperature has risen by 90 % of the temperature rise at thermal equilibrium.

Performance Safety Requirements

5.1. Burner resistance to overheating

Requirements

When the appliance is tested as described below the various parts of the burner shall show no deterioration other than superficial alterations arising from combustion.

Tests

The tests shall be carried out with the reference gas for the appliance category with the corresponding injector. The test pressures used shall be as defined for the gas in Annex 4.4.

For aerated burners, the gas shall be lit intentionally at the injector at normal test pressure and also, if possible at the burner head. If combustion can be maintained under these conditions, the test shall be continued for 15 minutes.

If combustion is not maintained at the injector or within the burner when the burner is working at its normal rate, the test shall be carried out by decreasing the pressure until combustion can be maintained but stopping when minimum test pressure is reached. If there is a reduced rate position and if the preceding test does not allow combustion to be maintained at the injector or within the burner, the test shall be repeated at the reduced rate position.

5.2. Temperature of control handles

Requirements

The surface temperatures of the areas of the appliance intended to be touched, and under the conditions described below. When measured by contact thermocouple after 20 minutes operation of the appliance shall not exceed the ambient temperature by more than :

30° C for metals or equivalent materials
45° C for porcelain or equivalent materials
60° C for plastics or equivalent materials.

Test

The test is carried out with the reference gas at its nominal heat output.

5.3. Temperature of the appliance case and protection of adjacent walls

Requirements

The temperature of the appliance case, measured in the conditions given below, shall not exceed the ambient temperature by more than 80° C. However, in the zone limited by two parallel planes situated respectively at 10 cm above and below the horizontal plane containing the base of the heating body, the temperature of the appliance case may exceed the ambient temperature by 110° C, in the zone limited by two planes situated respectively at 3cm above and below the horizontal plane containing the base of the heating body the temperature of the appliance case may exceed the ambient temperature by 130° C.

The measurements of the temperature of the surface of the appliance case are effected during the examination of the surface temperature of the wall to which the appliance is attached in corner to check that wall temperature does not exceed the ambient temperature by more than 50° C.

Details of the carrying out of the tests are as follows :

Test

The appliance, as supplied by the manufacturer, is installed in a test corner, consisting of a floor formed by a horizontal oak panel and of two walls at right angles formed by vertical oak panels.
The installation shall take due account of any clearances specified in the manufacturer's installation instructions.
The oak panels shall be 25 mm thick and finished in matt black paint; their dimensions shall be such that they extend at least 5 cm outside the corresponding dimensions of the appliance.
Thermocouples are incorporated into each panel at the centre of 10 cm squares and penetrate the panels from the outside so that the junctions are situated 3 mm from the surface facing the appliance.

The burner is adjusted to its nominal heat input with reference gas at normal test pressure.

The water rate is adjusted so that the inlet water temperature is below 25° C and does not vary by more than ± 0.5° C during the test, the temperature rise of this water being 40 ± 1° C for all appliances, whatever their output.

The test is carried out in normal flueing conditions, i.e.

- type A appliances (small water heaters) with deflector
- type B appliances with a 0.50 m flue
- type C appliances set up as described in clause 5.4.3 in still air and clause 5.4.4 in non-vitiated air (all dampers open and fan stopped).

Readings are taken, after the appliance has been in operation for 20 minutes, of the surface temperature of the appliance case and of the test wall temperatures and, for appliances fitted on the floor, of the test floor temperature also.

The hottest parts of the case are found by using materials such as thermo-colourant paints. The exact temperatures at these spots are then determined by means of thermocouples placed so that the thermo-junction is in surface contact.

It is recommended that the appliance should be in a room with an ambient temperature of approximately 20° C for this test.

If it is observed that the temperature of the surface of the walls of the test corner exceed the ambient temperature by more than 50° C, the manufacturer shall indicate in the booklet of instructions for installation and regulation, the nature of efficient measures to protect the wall to which the appliance is fixed. In this case the manufacturer shall supply to the test station details of the protective measures described in the booklet and the test station shall verify that when these protection measures are carried out in accordance with the instructions in the booklet, the temperature of the surface of the walls of the test corner do not exceed the ambient temperature by more than 50° C.

5.4. Ignition : Cross-lighting : Flame stability

5.4.1 All Appliances

Requirements

When tested as described below, ignition and cross-lighting shall be assured. A slight tendency of the flame to lift is permissible at the moment of ignition, but the flame shall be stable thereafter. The flame shall never be extinguished by the influence of the test conditions.

Test - Still Air

The tests shall be carried out with the reference gas at its nominal useful output. The tests shall be carried out on the cold appliance and again at thermal equilibrium. Before testing, the burner with its appropriate injector shall be adjusted as follows:

The appliance shall be supplied with the reference gas corresponding to the category, at normal test pressure so as to give the nominal rate. If the pilot has an adjuster, it is adjusted to give the flame length of the rate stated by the manufacturer.

Without altering the adjustment of the pilot of the burner, the inlet pressure to the appliance shall be reduced to a value equal to 70 % of the normal pressure prescribed for the test gas in Annex 4.4. for the 1st and 2nd family gases ; and to the minimum prescribed pressure for 3rd family gases, in Annex 4.4.

If the taps have a reduced rate position, the test shall be carried out for that position.

Under these supply conditions, the ignition of the burner by the pilot shall be verified as well as the correct cross-lighting of the various parts of the burner.

Supplementary tests

All the tests shall be carried out with the reference gas at its nominal useful output.

5.4.2. Types A and B Appliances

Type A appliances are equipped with a deflector. Type B appliances are regulated to the draught created by a flue pipe 0.5 m high.

The appliance shall be supplied with the flame lift limit gas at maximum pressure, as prescribed for the test gas in Annex 4.4 It shall be subjected at burner level to an air stream from a fan of 200 mm diameter, operating at a speed of 2 m/s, the axis of which can be moved in a horizontal plane in all directions about the burner. The air speed shall be measured at approximately 0.5 m from the appliance, the air outlet of the fan being at least 1 m from the appliance.

Type B appliances including type A appliances converted to type B (i.e. equipped with draught-diverter)

For type B appliances and those of type A fitted with a flue socket, a second test shall be carried out under the same supply conditions with the appliance connected up as shown in Figure 4 applying a continuous down draught of 3 m/s in the test flue, but without being subjected to the draught at burner level. For type B appliances a further test is carried out with the flue-pipe blocked.

5.4.3. Type C_1 appliances

Requirements

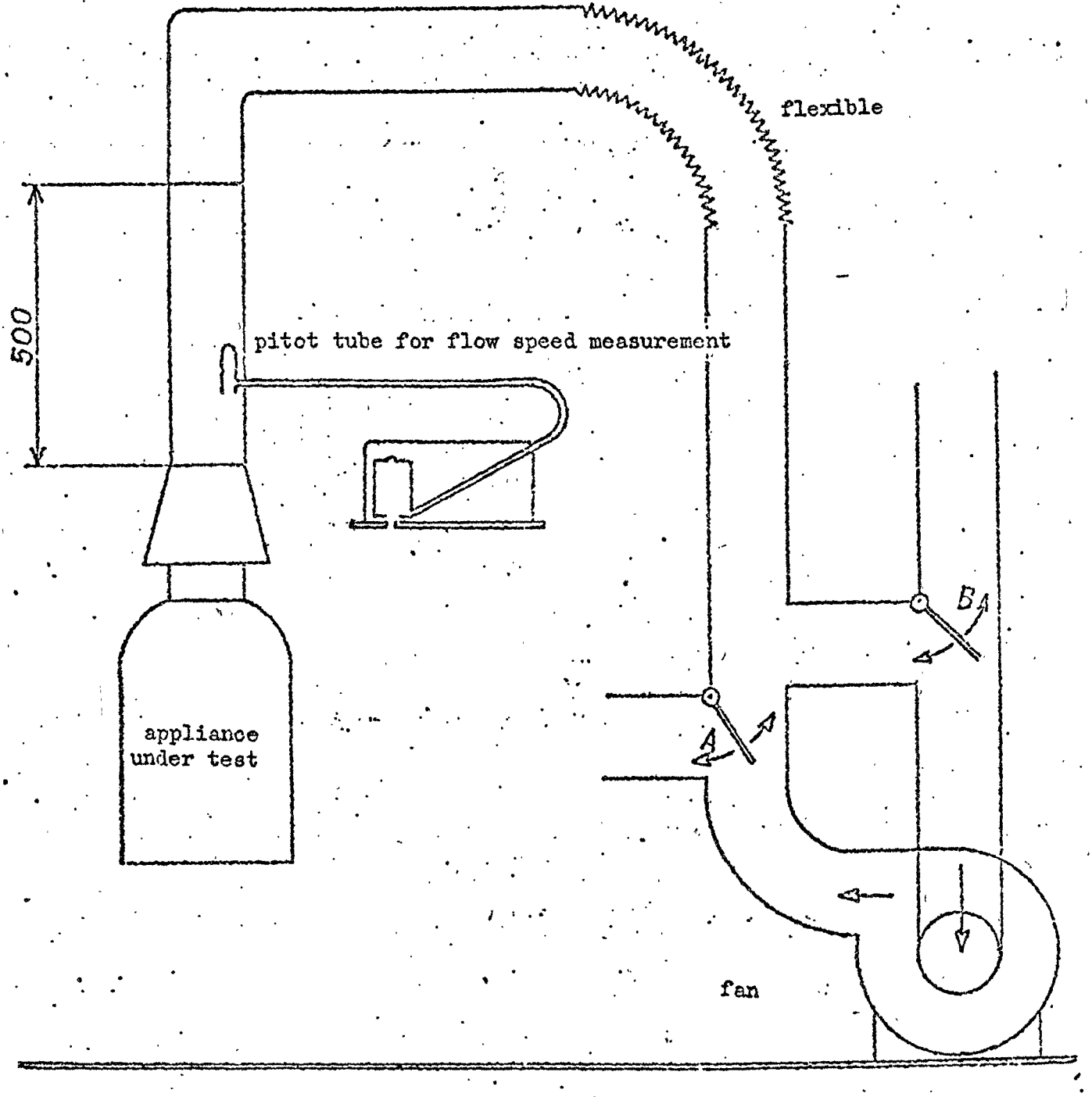
In the test conditions described below, the light of the pilot flame, the cross-lighting of the burner from the pilot flame, the lighting of the entire burner as well as the flame stability of the pilot and the burner shall be correct. A slight perturbation of the flame is acceptable, but no extinction of the flames shall occur.

Tests

The appliance is mounted in accordance with the directions furnished by the manufacturer on the test wall described in figure 4. The appliance is supplied with one of the reference gases and at the nominal pressure corresponding to its category. If the appliance is fitted with a gas rate adjusted, the gas rate is adjusted to the nominal rate. The appliance is then submitted to the following tests

FIGURE 4 - -

Test apparatus for abnormal draught
(type B appliances)



A and B : by-pass valves to obtain a downdraught or a suction

The appliance is subjected to the effects of wind speeds of 2.5 m/s, 5 m/s and 10 m/s from incidence angles of 15°, 30°, 45°, 60°, 75° and 90°, and, for each of these, for azimuth angles of 60°, 90° and 120°. If the appliance is non-symmetrical, the number of incidence angles shall be continued through 105°, 120°, 135°, 150°, 165°, and 180°. For each of these 63 or as the case may be 108 conditions points, it is visually verified that the requirements, as stated above, are met.

At each azimuth angle, the three incidence angles at which the flame shows the greatest disturbance are noted, and at these points the flame of the pilot and the burner shall be extinguished, and the possibility of re-lighting the pilot shall be verified. The appliance shall be considered to have passed this test if it is verified that the pilot ignites once in five attempts.

If at any azimuth angle, the flame shows no appreciable disturbance at any angle of incidence, the possibility of re-lighting the pilot after the burner and pilot have been extinguished, shall be verified for an angle of incidence of 90° only.

Practical considerations

To save time, the test for re-lighting of the pilot, as described, above should be carried out on the three incidence values or, as the case may be at the 90° incidence value, for a particular value of the azimuth angle before altering the azimuth angle before altering the azimuth angle. The CO content test, as described in clause 5.9, should also be carried out in the course of this test, again before changing the azimuth angle.

The Efficiency test, as described in clause 4.5, should be carried out in conjunction with these tests, so as to avoid having to dismantle and re-mount the test equipment.

5.4.4. Type C_2 appliances

Requirement

When tested as described below, ignition, cross-lighting and flame stability of the burner shall be correct. There shall be no flame extinction.½

Test

A suitable test apparatus is shown diagrammatically in figure 3. It consists of a completely enclosed loop of 225 mm by 400 mm rectangular ducting, through which air is circulated by a bifurcated axial flow fan. Velocity and pressure conditions are controlled by a series of single leaf dampers.

A water heater is supplied to provide an additional source of vitiation, its inlet being open to air and fitted with an air control slide F.

The test appliance is mounted precisely according to the manufacturer's instructions on a long side of the duct, with the appliance at least 2 m above the top of the horizontal base limb and with at least 1 m of vertical duct above the appliance. Access panels are provided on the back of the mounting panels to facilitate the fitting of the sampling tubes and thermocouple.

The flow in the duct may be measured by an anemometer which is placed 1 m above the top of the horizontal base limb. A calibration factor is used to convert the anemometer reading to the mean flow as determined by pitostatic tube traverses. To cover the flow range of 0.3 m/s to 5 m/s, two interchangeable anemometers may be required.

The test apparatus is designed to be operated either as a closed or open circuit, or in any condition intermediate between these extremes. In practice either the open circuit or an intermediate condition may be required.

The appliance supplied with reference gas and adjusted to its nominal heat input shall be connected to the test duct shown in figure 3 and the test apparatus shall be capable of being adjusted to give the following conditions in the duct :

1. an upflow of average velocity 2 m/s and a CO_2 concentration of 1.6 % within the temperature range 60° C to 80° C.

2. an upflow of average velocity 4.5 m/s and a CO_2 concentration of 0.75 % within the temperature range 40° C to 60° C.

To obtain the required condition, (1 or 2) proceed as follows :

- with dampers E and F closed, start the fan and control flow rate and degree of vitation in the system by means of dampers A, B, C and D. If it is required to augment the degree of vitation, open damper F and light the water heater. Control the proportion of fresh air to re-circulated air by combinations of adjustments to dampers A, B and C ; damper D providing an overriding flow rate control.

Operate the control tap and observe the ignition, cross-lighting and flame stability.

5.5. Flame failure devices

Requirement

The ignition delay for all appliances shall not exceed 20 seconds when manual intervention is required. Otherwise, this limit shall not exceed 60 seconds. The extinction delay for all appliances shall not exceed 60 seconds.

Test

The tests shall be carried out with reference gas at normal test pressure. The appliance shall be adjusted to nominal heat input if necessary.

After this adjustment has been made, the appliance, including the pilot, shall be turned off and allowed to cool to ambient temperature. Gas should again be supplied to the burner, the pilot lit and at the same time, the draw-off water tap shall be fully opened. It shall be verified that after a time equal to the limit specified above, the burner functions.

The appliance shall then be left to operate at its nominal rate for at least 10 minutes.

The extinction delay shall be measured between the moment when the pilot and burner are deliberately extinguished by cutting off the gas supply, and the moment when, after turning on again, the gas supply is stopped through the action of the flame failure device. A gas meter or other appropriate device may be used to detect the closure of the valve of the flame failure device.

5.6. Ignition devices

Requirements

When tested under the conditions given below the pilot heat input shall not exceed 0.17 kW (net CV) or 0.187 kW (gross CV).

The pilot shall ensure positive ignition of the main burner even when the rate of this pilot is reduced to the minimum required to keep the supply to the burner open.

The burner shall ignite quietly at all the operational rates required by the manufacturer, and shall not light back or show any prolonged flame lift.

However, brief light back is tolerated at ignition or extinction, provided that it does not affect the correct performance.

The pilot shall not be extinguished during ignition or extinction of the burner ; whilst in operation it shall not shorten to such an extent that it cannot function correctly, e.g. burner ignition or operation of the flame failure device.

The pilot shall be lit for sufficient time to produce normal and regular appliance performance, and shall continue to operate satisfactorily, even if the gas to the main burner is turned on and off quickly several times by the operation of the hot water draw-off tap.

Test

The heat input of the pilot shall be determined by supplying it with the reference gas or gases at the maximum pressure, as prescribed for the test gas in Annex 4.4, for gases of the 1st family and at normal pressure for gases in the 2nd and 3rd families. If there is a pilot gas rate adjuster, the test shall be carried out at maximum pressure for the minimum section of gas way with the gas for which the adjuster is designed.

For ignition tests the main burner shall be previously adjusted to nominal heat input with reference gas at normal test pressure. The reference gas shall then be replaced successively by the corresponding flame lift and light back gases and the inlet pressure shall be lowered to the minimum pressure prescribed for the test gas in Annex 4.4. The pilot rate shall be decreased to the minimum required to keep the gas supply to the main burner open.

Compliance with the above requirements shall then be verified.

5.7. Governors

Requirements

The gas rate of a governed appliance, when tested as described below shall be not greater than 7.5 % above or 10 % below the gas volume rate to which the appliance is adjusted in the test. 1st family gases and for 2nd family gases shall not vary by more than ± 5 %.

Test

If the appliance has an adjustable governor, it shall be adjusted to give the nominal gas volume rate with reference gas at the normal pressure prescribed for that gas in Annex 4.4. Keeping the initial adjustment, the supply pressure shall be varied between the minimum and maximum pressures prescribed for the test gas, and the gas rate shall be measured at each pressure. This test shall be carried out for all the reference gases for which the governor is not put out of action.

5.8. Overheating of Water

Requirement

When tested as described below the highest flow temperature recorded shall not exceed the temperature for which the appliance is set to operate by more than 20° C, and in no circumstances shall the temperature of the water exceed 95° C.

Test

With the cold water temperature below 25° C, the appliance shall be adjusted to the nominal heat input and to a water rate corresponding to a temperature rise of 50° C.

When thermal equilibrium is reached, the hot water draw-off tap shall be quickly closed. After 10 seconds it shall be re-opened quickly and the highest flow temperature measured with a rapid indicating thermometer.

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The appliance shall be allowed to operate until it has again reached thermal equilibrium. The test shall be repeated, increasing each time by 10 seconds the interval, the tap is kept closed. The highest flow temperature obtained shall be compared with the temperature at which the appliance is set to operate.

5.9. Carbon Monoxide content of combustion products

Requirements

Under the test conditions defined below the carbon monoxide content in the air-free, dry products of combustion shall not exceed :

0.10 % when the appliance is supplied with reference gas under normal conditions. However for type C_1 appliances under the conditions given in clause 5.4.3 this value will be 0,2 %.

0.20 % when the appliance is supplied with the incomplete combustion limit gas.

Tests

5.9.1. General

The appliance is supplied with gas, and if necessary adjusted according to the instructions given in clauses 5.4.2 and 5.9.2.

The water rate is adjusted under the same conditions as in clause 4.5.

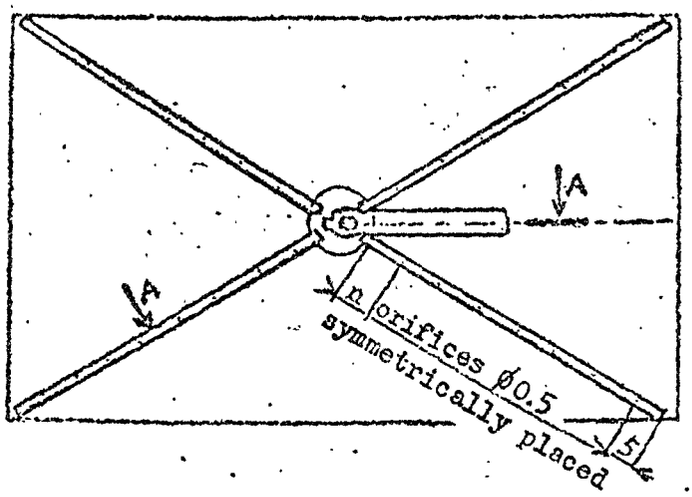
When the appliance is at thermal equilibrium, a sample of the products of combustion is taken by an aspiration probe placed as near as possible to the heat exchanger outlet (see typical example in figure 5).

The CO content is measured by means of apparatus capable of determining CO contents between 5.10^{-5} and 100.10^{-5} parts by volume. In the range used, the method shall be selective to $\pm 5.10^{-5}$ and accurate to $\pm 2.10^{-5}$ parts of CO by volume. Instruments which correspond exactly to these requirements are those using infra red. Precautions have to be taken to eliminate any extraneous CO_2.

FIGURE 5

Typical probe for combustion product sampling

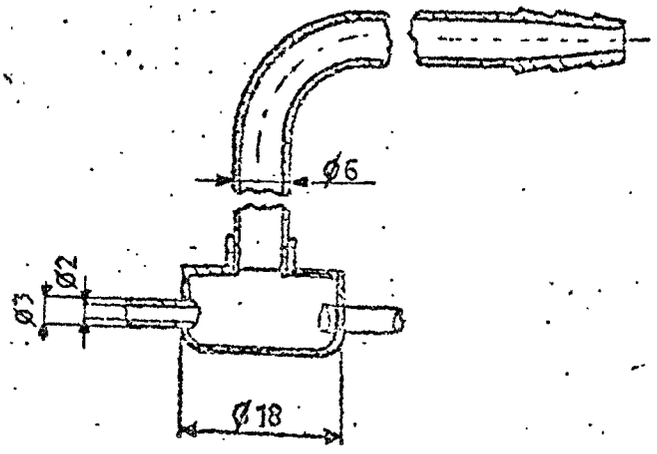
View from above - ½ scale



n = 3 per branch

The sampling orifice arms are arranged to obtain representative samples

section AA - scale



Dimensions are in millimetres

CO_2 is measured by a method accurate to within 5 %.

The CO content relative to the dry air free products of combustion (Theorical combustion) is given by the formula :

$$\% \text{ CO} = \% \text{ CO}_2 \text{ (Theorical combustion)} \times \frac{[\text{CO}]}{[\text{CO}_2]} \text{ (measured in the samples)}$$

The values of % CO_2 (theorical combustion) are given for the test gases in table 5.

Table 5 : CO_2 percentages

designation of gas	G110	G20	G21	G25	G26	G30	G31
% CO_2 (theorical combustion)	7.6	11.7	12.2	11.5	11.8	14.0	13.7

The CO content relative to the dry air free products of combustion may also be calculated by the formula :

$$\% \text{ CO} = \frac{21}{21 - [\text{O}_2]} \times [\text{CO}] \text{ (measured in the selected sample)}$$

$[\text{O}_2]$ being the oxygen content (%) in the sample.

The use of this formula is recommended where it gives greater accuracy than the formula bases on $[\text{CO}_2]$ content measured in the selected sample.

5.9.2. Tests in Still Air

An appliance of type A or B is placed in a suitable ventilated room with the back surface as near as possible to a wall and in accordance with the manufacturer's instructions.

A type B appliance or a type A appliance fitted with a draught-diverter is subjected to a draught created by 0.50 m flue. A type A appliance is also tested with its deflector.

A type C_1 appliance is tested in still air installed as indicated in clause 5.4.3. according to the manufacturers instructions.

A type C_2 appliance is tested in still air, installed according to the manufacturer's instructions on the test duct described in clause 5.4.4. with all dampers open and the fan not in operation.

Whatever the type, the appliance is first tested with the reference gas or gases in the category to which it belongs, and which are set out in Annex 4.3. table 8.

- for an appliance without a governor or gas rate adjuster, the test is made by supplying the appliance at the maximum pressure indicated in Annex 4.4.
- for an ungoverned appliance with a gas rate adjuster the test is made with the burner adjusted to give a rate equal to 1.10 times the nominal rate
- for a governed appliance the test is made by bringing the burner rate to a value 1.07 times the nominal rate for gas G 110 or 1.05 times the nominal rate for gases G 20 or G 25.

An appliance with a gas rate adjuster or governor, which is immobilized for one or several gas families, is tested successively according to the various supply cases defined.

After the test with the reference gas or gases the appliance is tested with the incomplete combustion limit gas in the category to which the appliance belongs and which is given in Annex 4.4.

In the three cases cited above the appliance is :

(I)- Supplied with the reference gas, the heat input being adjusted to a valve equal to 1.05 times the nominal rate.

(II)- Supplied with the corresponding incomplete combustion limit test gas, without changing either the adjustment of the appliance or the supply pressure.

5.10. Aptitude with gases other than the reference gases

Requirements

The under-mentioned specified tests must be carried out with accurate results,-(See test for reference gas), - relative to pilot, cross-lighting and flame stability.

Test

The burner is supplied with the reference gas corresponding to the category, at normal test pressure so as to give the nominal rate. If the pilot has an adjuster, it is adjusted to give the flame length or the rate stated by the manufacturer.

Without altering the adjustment of the pilot or burner, the reference gas is replaced successively by the various limit gases for the appliance category and defined in annex 4.1 table 7, the supply pressure being brought to the values given in : annex 4.4 table 9.

The tests are carried out under the following conditions :

- Normal pressure for the "sooting" limit gas

Note : the appearance of yellow tips is accepted if it does not produce carbon deposits.

- Maximum pressure for the "flame lift" limit gas

Note : a slight tendency to lift is accepted ; a governed appliance is adjusted with the reference gas so that the heat input obtained is 10 % higher than the nominal heat input

- Minimum pressure for the light back limit gas

- Under the supply conditions given in clause 5.9.2 for the incomplete combustion limit gases.

ANNEX II

Terms, Definitions and Symbols

2. Appliance Components

2.1 Appliance with sealed combustion circuit (room sealed appliance) :

An appliance in which the combustion circuit (air intake, combustion chamber, exchanger, products outlet) is sealed in relation to the place where the appliance is installed.

The appliance is either :

- a balanced flue appliance, in which the appliance is connected to a special device in the outer wall by two ducts, one bringing in the combustion air and one evacuating the products (balanced flue).

- a sealed duct appliance in which its appliance is connected to a common duct bringing in the combustion air and evacuating the products (sealed).

2.2 Auxiliary equipment

Embraces the accessory devices of an appliance, e.g. taps, flame failure and ignition devices, governors, thermostats, etc..

2.3 Mechanical joint (or mechanical means of obtaining soundness).

A connection device assuring soundness in an assembly of several parts, generally of metal, e.g. conical joints, O-rings or flat joints.

2.4 Flue socket

The part of an appliance for connection to the flue, for evacuating the combustion products.

2.5 Draught-diverter

A device placed in the combustion products circuit of an appliance, to reduce the influence of draught and down-draught on the burner performance and combustion.

2.6 Burner

A component which affects the gas/air mixing and ensures the gas combustion.

It may be one of the two types :

- aerated burner : a burner in which all or part of the air necessary for combustion, called primary air, is entrained by the gas jet and is mixed with the gas before the burner port, the complement of air entrained at the port is called secondary air.

- non aerated burner : a burner, in which the air necessary for combustion is entrained entirely from the atmosphere at the burner port.

2.7 Pilot

A small burner which ignites a main burner by means of a flame.

2.8 Restrictor

A device with a calibrated orifice, which is placed in the path of the gas flow between the inlet connection of the appliance and a burner, to create a pressure drop and thus reduce the gas pressure at the burner to a predetermined value for a given supply pressure.

2.9 Gas rate adjuster

A device allowing the gas rate to a burner to be set at a predetermined value according to the supply conditions.

The operation of changing the setting of this device is called the adjustment of the gas rate.

2.10 Water rate adjuster

A device allowing the water rate to be pre-set to a predetermined value according to supply conditions.

2.11 Water Tap

A device to control the flow of water through the appliance.

2.12 Tap handle

A manually operated component used to open, partially open or close a tap.

2.13 Gas governor

A device which provides a sensibly constant pressure or gas rate downstream when the upstream pressure is variable.

2.14 Temperature selector

A device which allows the selection of the desired water flow temperature.

2.15 Ignition device

A device to ignite one ore more burners.

It may be, for example :

- either electric (resistance, spark, etc.)
- or thermal (pilot).

2.16 Injector

A component part which admits the gas into an aerated burner.

2.17 Flame failure device

A device including a sensing element which causes the gas supply to a burner to be opened or closed according to the presence or absence of the flame which activated the sensing element.

3. Gases

3.1 Classification of gases

The gases capable of being used are classified in three families, in accordance with their Wobbe numbers, as indicated in the following table :

Table 6.

Family	Description	Wobbe number in MJ/m^3 referred to	
		Gross Calorific Value	Net Calorific Value
First	Manufactured	23.8 to 31.4	21.5 to 28.7
Second	Natural		
- Group H		48.1 to 57.9	43.4 to 52.4
- Group L		41.3 to 47.3	37.1 to 42.7
Third	Liquefied Petroleum	77.4 to 92.4	72.0 to 85.3

3.2 Reference Gas :

The gas of each family or group which, in general corresponds to that most generally used, and for which the appliance is designed.

3.3 Limit Gas :

The gas which corresponds to the extreme variations of the characteristics of the gas distributed.

3.4 Test Gases :

The reference and limit gases used in the tests referred to in this directive.

3.5 Net calorific value (net C.V.) Ip

The quantity of heat produced by combustion at constant pressure of unit (volume or weight) of gas, the combustion products brought to 0° C, but supposed to contain the water of combustion in the vapour state and the air necessary for the combustion considered as previously dry at 0° C, the gas measured dry at 0° C and under a pressure of 1.013 bar.

It is expressed in MJ per m^3 of dry gas, measured at 0° C, 1013 mbar, or in MJ per kg of dry gas.

3.6 Gross calorific value (gross C.V.) Pp

The quantity of heat produced by the combustion, at a constant pressure, of unit (volume or weight) of the gas considered, the combustion water condensed, under the same reference conditions as for the net C.V.

It is expressed in MJ per m^3 of dry gas, measured at 0° C, 1013 mbar, or, in MJ per kg of dry gas.

3.7 Relative density (relative to air) - d

The ratio of the masses of equal volumes of gas and air, (dry, at 0° C and at a pressure of 1.013 bar).

3.8 Wobbe number

The ratio of the calorific value of the gas to the square root of the relative density of the same gas.

4. Combustion

4.1 Aerated flame, blue flame

The flame obtained by the combustion of gas previously mixed with air.

4.2 Flame lift

A phenomenon characterized by the total or partial separation of the base of the flame from the burner port.

4.3 Flame stability

The state of the flames resting in a stable manner on the burner ports with no danger of flame lift or light-back.

4.4 Light-back

The combustion of a flame in the body of a burner.

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4.5 Non-aerated, diffuse flame

The flame obtained by the combustion of gas which comes into contact with air at the moment of combustion.

4.6 Yellow tipping

A phenomenon characterized by the appearance of yellow colouration at the top of the blue cone of aerated flames.

5. Testing

5.1 Gas - Reference conditions

The atmospheric conditions under which the gases are tested are dry gas at 1013 mbar pressure and at a temperature of 15° C or 0° C.

5.2 Gas supply test pressure

The relative static pressure measured at the gas inlet connection of the appliance.

5.3 Gas rates

Gas rates are determined in the steady state condition, when all the parts have been reached thermal equilibrium.

5.3.1 - gas volume rate :

The volume of gas in cubic metres passed in unit time, corrected to reference conditions.

- gas mass rate :

The mass of gas in kilograms passed in unit time under reference conditions.

5.4 Nominal water rate

The rate obtained with the nominal useful output of the appliance for a temperature rise of 25° C.

5.5 Heat input

The product of the volume or mass rate and the calorific value (gross or net) of the gas brought to the same reference conditions.

5.5.1 Nominal heat input

The heat input calculated from the nominal useful output, assuming a conventional efficiency of 0.84 (on net C.V.) and of 0.75 (on gross C.V.).

5.6 Useful output

The quantity of heat absorbed by the water drawn off, during unit time.

5.6.1 Nominal useful output

The useful output declared by the manufacturer and marked on the appliance. 90

5.7 Efficiency

The ratio of the useful output to the heat input, the two quantities being expressed in the same unit.

5.8 Soundness

Freedom from gas or water leaks.

A N N E X III

Classification of Appliances

3.1 Classification in categories, in accordance with the family or families of gas which may be used by the appliance.

Category I appliances are those designed to be used with gases of only one family or, possibly with gases of only one group of a family, at a fixed gas supply pressure.

Category II appliances are those designed to be used with gases of two families, at a fixed gas supply pressure.

Category III appliances are those designed to be used with gases of all three families at a fixed gas supply pressure.

Sub-classification of Category I appliances.

Category I appliances are sub-classified as follows :

Category		Appliances designed to be used
I_2	:	With all second family gases.
I_{2HL}	:	With all second family gases.
I_{2H}	:	Only with gases of Group H of the second family.
I_{2L}	:	Only with gases of Group L of the second family.
I_3	:	With all third family gases.

Sub-classification of Category II appliances.

Category II appliances are sub-classified as follows :

Category		Appliances designed to be used
II_{12}	:	With all gases of the first and second families.
II_{12HL}	:	With all gases of the first and second families.
II_{12L}	:	With all gases of the first family and with gases of Group L of the second family.
II_{23}	:	With all gases of the second and third families.
II_{12H}	:	With all gases of the first family and with gases of Group H of the 2nd family.

Sub-classification Category II appliances - Contd.

Category		Appliances designed to be used
II_{2HL3}	:	With all gases of the second and third families.
II_{2H3}	:	With all gases of the third family and with gases of Group H of the second family.
II_{2L3}	:	With all gases of the third family and with gases of Group L of the second family.

3.2 Classification in types, according to the method of evacuation of the products of combustion.

Type A	:	Unflued appliances.
Type B	:	Normal flue appliances.
Type C_1	:	Balanced flue appliances communicating directly with the outside atmosphere in which a duct conveys the air for combustion from the open air and the products of combustion are removed through a separate flue or duct in which an extractor fan is used if necessary.
Type C_2	:	Sealed flue appliances communicating indirectly with the outside atmosphere and in which a common duct conveys the air for combustion and carries away the products of combustion.

3.3 Classification according the Nominal Useful Output

Appliances are classified according to their nominal useful output :

(i)	small water heaters	:	nominal useful output less than 10 kW.
(ii)	large water heaters	:	nominal useful output 10 kW to 30 kW.
(iii)	hot water distributors	:	nominal useful output over 30 kW.

3.4 Classification according to the water pressure

Appliances are classified according to the water pressure in the appliances as :

Free-flow appliances : The water tap is placed upstream of the appliance, which is designed to allow the water to flow freely.

Low-pressure appliances : The water tap is placed downstream of the appliance, the supply pressure limited to 2.5 bar.

Normal pressure appliances : The water tap is placed downstream of the appliance, which is designed to be connected to a water supply system with a maximum pressure of 10 bar.

High pressure appliances : The water tap is placed downstream of the appliance, which is designed to be connected to a water supply system with a maximum pressure of 13 bar.

A N N E X IV

Test Gases and their use in Testing Appliances

4.1 Characteristics and designations of Test Gases

The characteristics of the test gases and their designations are given in Table 7.

TABLE 7 - Test gas characteristics

family			designation	composition by volume	Wobbe N° (on net CV) MJ/m3	Net CV MJ/m3	Wobbe N° (on gross CV) MJ/m3	Gross CV MJ/m3	Relative density (Air=1)
1st family	group a	Reference gas	G 110	50 % H_2 26 % CH_4 24 % N_2	22.9	14.7	26.1	16.7	0.411
		Light back gas	G 112	59 % H_2 17 % CH_4 24 % N_2	20.5	12.4	23.6	14.3	0.367
	group b	Reference gas	G 120	47 % H_2 32 % CH_4 21 % N_2	26.8	17.2	29.3	18.8	0.412
2nd family	group H	Refer. gas incomplete	G 20	CH_4	48.2	35.9	53.6	39.9	0.554
		Incomplete combustion & yellow tips limit gas	G 21	87%CH_4 13%C_3H_8	52.4	43.4	57.9	47.9	0.685
		Light back limit gas	G 22	65 % CH_4 35 % H_2	43.7	27.1	49.0	30.4	0.384
		Flame lift limit gas	G 23	92.5%CH_4 7.5%N_2	43.4	33.2	48.2	36.9	0.585
	group L	Refer.gas & light back limit gas	G 25	86%CH_4 14%N_2	39.4	30.9	43.9	34.3	0.612
		Incomplete combustion & yellow tips limit gas	G 26	80%CH_4 7%C_3H_8 13%N_2	42.7	35.2	47.4	39.1	0.678
		Flame lift limit gas	G 27	82%CH_4 18%N_2	37.1	29.4	41.3	32.7	0.628
3rd family		Reference gas & incomp. combustion & yellow tips limit gas	G 30	C_3H_{10}	85.3	122.8	92.3	133.1	2.077
		Light back limit gas	G 32	C_3H_6	72.0	87.8	77.0	93.8	1.481
		Flame lift limit gas	G 31	C_3H_8	74.9	93.6	81.5	101.8	1.562

The composition of the test gas shall be as close as possible to that stated in Table 7 and the Wobbe number shall be within ± 2 % of the value state - this tolerance includes the error of the measuring equipment.

The purity of the constituents of the test gases shall be not less than the value set out below, unless the composition of the final mixture is identical with that stated in Table 8

nitrogen	N_2	99 %	
hydrogen	H_2	99 %	
methane	CH_4	95 %)	with a total content of H_2, CO
propane	C_3H_6	90 %)	and O_2 less than 1 % and a total content
propane	C_3H_8	95 %)	of N_2 and CO_2 less than 2 %
butane	C_4H_{10}	95 %)	

For second family reference gases of designations G20 and G25, natural gas from either group H or group L with suitable addition of propane or nitrogen may be used for testing in place of the reference gas, even if its composition does not comply with the requirements, provided that the final mixture has a Wobbe number within ± 2 % of the value given in the Table for the corresponding reference gas.

For limit gases G21, G22 and G23, natural gas of group H may be used instead of methane to make up the test gas. For limit gases G26 and G27, a natural gas of either group H or group L may be used instead of methane.

For limit gases G21, G23, G26 and G27, the constituents stated in the Table 5 may be varied, provided that the final mixture has a Wobbe number within ± 2 % of the value given in the table for the corresponding limit gas.

For limit gas G22, the constituents may also be varied, provided that the Wobbe number lies within 2 % of the values stated, and provided also that the final mixture contains 35 % hydrogen.

4.2 Use of Test Gases

The test set out in Clauses :

Obtaining the nominal rate

Burner resistance to overheating

Ignition, cross-lighting, flame stability

Ignition devices

Governors

Combustion

Aptitude for use with gases other than the reference gases, shall be carried out with the gases as defined in Annex 4.1.

In the tests given in other clauses in order to facilitate making up, the reference gas may be replaced by a gas actually distributed, provided the following requirements are satisfied simultaneously :

(i) the burner is adjusted to give the same heat input as with the reference gas - the injector may be changed if necessary,

(ii) the primary aeration rate shall be approximately that obtained with the corresponding reference gas by adjusting the supply pressure.

4.3 Choice of Test Gases

When an appliance may be used with gases of several groups or families, the reference and limit test gases used shall be as given in Table 6 for the category of gas for which it is proposed to test the appliance. Before testing, the burner shall be adjusted to use the reference gas at the nominal rate. The test shall be made with the injector adjusted to correspond to the reference gas of the group to which the limit gas used in the test belongs. For categories I_2, II_{12} and III_{23}, the test with G27 shall be made with a single injector corresponding to G20 and G25 - gases.

TABLE 8 : Appliance category test gases

TEST	I_2	I_{2HL}	I_{2H}	I_{2L}	I_3	II_{12}	II_{12HL}	II_{12H}	II_{12L}	II_{23}	II_{2HL3}	II_{2H3}	II_{2L3}	III
reference gas	G20	G20 G25	G20	G25	G30	G110 G 20	G110 G120 G 20 G 25	G110 G 20	G110 G 25	G20 G30	G20 G25 G30	G20 G30	G25 G30	G110 G120 G 20 G 25 G 30
incomplete combustion	G21	G21 G26	G21	G26	G30	G 21	G 21 G 26	G 21	G 26	G21	G21 G26	G21	G26	G21 G26
light back	G22	G22	G22	G25	G32	G112	G112	G112	G112	G22	G22	G22	G32	G112
flame lift	G27	G27	G23	G27	G31	G 27	G 27	G 23	G 27	G27	G27	G25	G27	G 23 G 27
yellow tips	G21	G21	G21	G26	G30	G 21	G 21	G 21	G 26	G30	G30	G30	G30	G30

4.4 Test Pressures

The values of the test pressure, i.e. the pressure supplied at the appliance gas limit. Gas inlet shall be given in Table 9.

These pressures and the corresponding injectors shall be used in accordance with the requirements given in the country in which the appliance is to be installed.

TABLE 9 - Test Pressures

Type of Gas	Normal test pressure in mbar	Minimum test pressure in mbar	Maximum test pressure in mbar
1st family gas	8 8	6 7,5	15 15
2nd family gas group H	18 20	15 18	23 25
2nd family gas group L	25 20	20 18	30 25
3rd family gas	28 37 50 67 112 148	20 25 25 42,5 50 60 100	35 35 45 57,5 80 140 180

ANNEX A

EEC APPROVAL

1. Procedure

The applicant must supply the following documents:

a) Plans and diagrams drawn to an adequate scale, at least 1:2.5, showing the construction of the appliance and all parts which are essential for its operation. The plans must show the dimensions in accordance with inspection requirements. They should preferably be prints from tracings;

b) A photograph of the appliance of format 13 x 18 cm;

c) Handbook and instructions (which will accompany mass-produced appliances);

d) Complete description of the appliance and its main components, including:

1. Type of construction and category of appliance;

2. Nature of gases likely to be used;

3. Manner of affixing and locating the data plate and its inscriptions;

4. Thermal treatment of materials used;

5. Interchangeability of the most important parts of the appliance, such as taps, control devices, safety devices, types of injector which may be fitted depending on the gas used.

e) Size and weight of the appliance.

2. Examination for EEC approval

At the time of EEC approval the Member State shall

- take all necessary measures to satisfy itself that the appliances offered for examination actually fulfil the requirements laid down in Article 7 of this Directive;

- verify that the documents submitted conform to the requirements;

- carry out on the appliances offered for examination the tests laid down in Section 4 of Annex I and verify that they conform to the characteristics specified;

- verify that all particulars required to be shown on the date plate affixed to the appliance (Annex C) are complete and legible;

- issue the approval certificate for the model conforming to the requirements of this Directive, together with the record of the tests.

ANNEX B

EEC VERIFICATION

1. Preparatory to EEC verification

The manufacturer or his authorized agent shall place at the disposal of the inspection authority:

- the EEC approval certificate;

- the records of inspections carried out during the manufacturing cycle;

- all documents which attest that every necessary step have been taken in respect of production of appliances conforming with the model which has obtained EEC approval.

2. At the time of EEC verification

The inspection authority shall

- confirm that the approval certificate has been obtained;

- confirm that an effective inspection system has been put into operation by the manufacturer;

- select from within the production line, or preferably at the end of this line, one or more appliances for the purpose of subjecting them to such tests and verifications as it considers necessary.

Special attention must be paid to tests relating to safety, where the rate of industrial production may affect the value of some parameters.

ANNEX C

DATA PLATE AND INSTRUCTIONS FOR USE

1. Language

All data and instructions contained in this Annex which must accompany the appliance shall be in the language of the country where the appliance is to be put into service or in one of the Community languages acceptable to that country.

2. Date plate

An irremovable date plate divided into two sections (see subsequent example) must be affixed to each appliance at a place which is visible when the appliance is installed, or in such a position that it is visible when the cover is removed.

On the first section shall be shown the data which secures free movement of the appliance, that is:

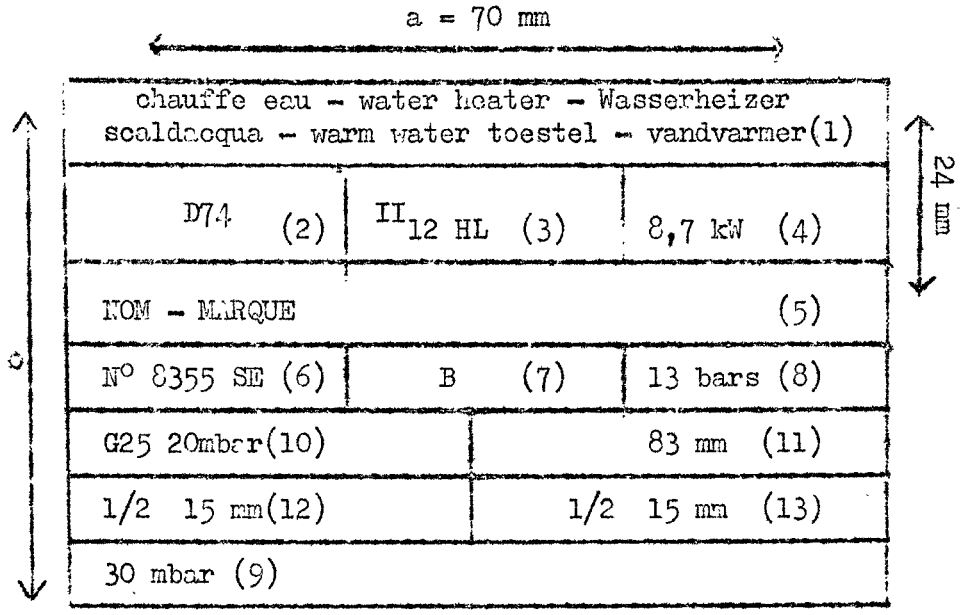
- designation of the appliance;
- the "CE" sign of conformity according to the specifications in Annex I to the Directive;
- the category of the appliance;
- the rated capacity of the appliance expressed in kW.

On the second section of the plate shall be shown

- the name of the manufacturer or person responsible for placing the appliance on the market;
- manufacture serial number;
- the appliance type;
- the maximum water pressure, expressed in bars, for which the appliance may be used;
- the gas supply pressure for the third family of gases, expressed in millibars;
- the nature and pressure of the gas for which the appliance has been regulated by the manufacturer to one of the pressures shown in Annex 3.4. (e.g., G25 gas at 25 mbar).

In Member States where several pressure connections are used for the third family of gases, the pressure to which the appliance has been regulated, shall be stated;

- the dimensions of the connections to the water and gas supply systems;
- the diameter of the damper outlet pipe for category B appliances.



1. Designation of the appliance in six languages.
2. "CE" mark of conformity.
3. Class of appliance.
4. Rated capacity of the appliance, expressed in kW.
5. Manufacturer's name or mark.
6. Manufacture serial number.
7. Appliance type.
8. Maximum water pressure, expressed in bars, for which the appliance may be used;
9. Gas supply pressure for the third family, expressed in millibars;
10. Nature and pressure of the gas to which the appliance has been regulated by the manufacturer.
11. Diameter of the damper outlet pipe for category B appliances.
12. Dimensions ofconnections to the water systems.
13. Dimensions of connections to the gas systems.

3. Instructions for use

The instructions for use, printed on durable paper, shall be supplied with each appliance and must:

- be entitled "Instructions for use";
- include the method of use;
- specify that the appliance must be installed by a specialist and that conversion of the appliance for use with other types of gas shall be carried out by a qualified fitter or by an organization;

- explain the normal operations involved in use of the appliance and in cleaning by the user;
- specify that, in the interests of the user, it is recommended that periodic adjustment of the appliance be carried out;
- include a guide to the types of products recommended by the manufacturer for cleaning the appliance;

- state the procautions to be taken against freezing;
- specify the recommendations to be made to prevent incorrect usage og the appliance;
- state, in the case of an appliance without an outlet tube for products of combustion, the normal conditions of use, and state in particular that the appliance must be operated only for short periods of time.

4. Technical instructions for installation and conversion

Each appliance shall be accompanied by instructions giving information on correct installation and on regulation, performance and maintenance of the appliance. These instructions must attract the attention of the fitter to the conditions laid down in Section 5.3 of Annex I to this Directive, relating to the thermal protection of thewalls.

The following information shall also be supplied:

- minimum size of the pipe to which type C2 appliances may be connected;
- general description of the appliance, with illustrations of the main components and, where appropriate, of their assembly and reassembly;
- illustration of the removable components and instructions on reassembly to avoid any faults;
- where necessary, instruction for regulation of the gas;
- a table giving the calorific value and the flow rate in dm^3/min or m^3/min for the various categories of gas;
- technical information on the inscriptions on the data plate;
- minimum water pressure at which the appliance may be used;
- instructions for conversion of the appliance to other types of gas, and details on the changing and readjusting control and regulating components. These instructions shall be supplied to and retained by the user.

ANNEX D

1. Rules of equivalence

Table 10 given as an example in this Annex must be applied in accordance with the follwing equivalences:

1.1. An appliance belonging to a given category may be marketed as an appliance covering a more restricted Wobbe index range, provided that the adaptation conditions laid down in Section 3.8, Table 3, are fulfilled, that its state of adaptation corresponds to that in the country in which it will be marketed and that the inscriptions on the data plate correspond to its adjustment.

This equivalence is recognized in principle, without the appliance being subjected to new tests.

Supplementary tests may, however, be made for the pressures and with the test gases used in the country in which the appliance it to be marketed where:

- the operating pressure in the country in which the appliance has been examined differs from that in the country in which it is to be marketed,
- the appliance, fitted with regulating components, whether sealed or not, is tested under the same conditions as the original category with test gases which differ from those in the country in which it is to be marketed;

In all cases, these supplementary tests shall consist at the most of those referred to below and laid down in Sections 4.2, 5.4, 5.5, 5.6, 5.7 and 5.9 of this Directive:

- obtaining the rated flow,
- ignition, inter-ignition, flame stability,
- ignition and extinguishing safety device,
- ignition device,
- gas-pressure regulator,
- burning.

Examples

- A category I_2 appliance for G 20 at 18 millibars and G 25 at 25 millibars may be marketed as a category I_{2H} appliance for G 20 at 18 millibars and as category I_{2L} appliance for G 25 at 25 millibars without supplementary testing,

- a category I_{2H+L} appliance for G 20 and G 25 at 20 millibars may be marketed as a category I_{2H} appliance for G 20 at 18 millibars, or as a category I_{2L} appliance for G 25 at 25 millibars, if it passes the relevant tests laid down in Sections 4.2, 5.4, 5.5, 5.6, 5.7, and 5.9, after any necessary change of injectors and/or after sealing of the regulating components in the appropriate positions.

- a category III appliance may be marketed as an appliance of any other category if the pressures and the gases employed in the tests are the same as those for that other category.

If, however, the test pressures and/or the test gases are different, the tests laid down in Sections 4.2, 5.4, 5.5, 5.6, 5.7 and 5.9 of this Directive must be carried out after the injectors have been changed, if necessary, and for after sealing of the regulating components in the appropriate positions, if they are not laid down for the class concerned.

1.2. An appliance belonging to a given category may be marketed as an appliance belonging to another category, but covering an identical Wobbe index range, provided that the adaptation conditions laid down in Section 3.8, Table 3, are fulfilled, that its state of adaptation corresponds to that in the country in which it will be marketed and that the inscriptions on the plate supplied on delivery correspond to its adjustment.

However, supplementary tests may be made for the test pressures and with the test gases used in the country in which the appliance is to be marketed where:

- the operating pressure in the country in which the appliance has been tested differs from that in the country in which it is to be marketed,

- the appliance, fitted with regulating components, whether sealed or not, is tested under the same conditions as the original category with test gases differing from those in the country in which it is to be marketed.

In all cases, these supplementary tests shall consist at the most of those referred to in Sections 4.2, 5.4, 5.5, 5.6, 5.7 and 5.9 of this Directive.

Examples

- a category I_2 appliance may be marketed as a category I_{2HL} appliance provided that it passes the tests laid down in Sections 4.2, 5.4, 5.5, 5.6, 5.7 and 5.9 for the test pressures and test gases used for category I_{2HL} and that it has appropriate injectors;

- a category I_{2HL} appliance may be marketed as a category I_2 appliance provided that it passes the tests laid down in Sections 4.2, 5.4, 5.5, 5.6, 5.7, and 5.9, for the test pressures appropriate to category I_2. In addition, regulating components, where present, must be blanked off and sealed in the appropriate positions.

1.3. An appliance belonging to a particular category may be marketed as an appliance in a category covering a wider range of Wobbe index values provided that it conforms with all the manufacturing charateristics of the new category contemplated.

In addition, it must be subjected to the tests referred to in Sections 4.2, 5.4, 5.6, 5.7 and 5.9 of this Directive, using the test gases of the new category contemplated and the appropriate test pressures.

TABLE 10: Examples of categories of appliance marketed in the Member States.

Country	I_2	$I_{2\ HL}$	$I_{2\ H}$	$I_{2\ L}$	I_3	II_{12}	II_{12HL}	$II_{12\ H}$	II_{23}	$II_{2\ HL3}$	$II_{2\ H3}$	III
A		yes (1)			yes		yes			yes		yes except G 26
B				yes	yes							
C					yes			yes				yes
D	yes				yes	yes			yes			yes, except G 120, G 23
E												
F			yes		yes			yes			yes	yes, except G 120, G 25, G 26, G 27
G				yes	yes							
H			yes		yes						yes	

(1) In the case of appliances in category $I_{2\ HL}$ fitted with diffusion-type burners, replacement of the burner is permitted, when a change is to be made from a group L gas to a group H gas, and vice versa.