

Specification for

Gas heated catering equipment —

Part 1: Safety requirements

The European Standard EN 203-1:1992 with the incorporation of its amendments A1:1995, A2:1997 and A3:1999 has the status of a British Standard

ICS 97.040.20

Cooperating organizations

The European Committee for Standardization (CEN), under whose supervision this European Standard was prepared, comprises the national standards organizations of the following countries:

Austria	Oesterreichisches Normungsinstitut
Belgium	Institut belge de normalisation
Denmark	Dansk Standardiseringsraad
Finland	Suomen Standardisoimisliitto, r.y.
France	Association française de normalisation
Germany	Deutsches Institut für Normung e.V
Greece	Hellenic Organization for Standardization
Iceland	Technological Institute of Iceland
Ireland	National Standards Authority of Ireland
Italy	Ente Nazionale Italiano di Unificazione
Luxembourg	Inspection du Travail et des Mines
Netherlands	Nederlands Normalisatie instituut
Norway	Norges Standardiseringsforbund
Portugal	Instituto Português da Qualidade
Spain	Asociación Española de Normalización y Certificación
Sweden	Standardiseringskommissionen i Sverige
Switzerland	Association suisse de normalisation
United Kingdom	British Standards Institution

This British Standard, having been prepared under the direction of the Gas Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 February 1993

© BSI 12-1999

The following BSI references relate to the work on this standard:
Committee reference GSE/19
Draft for comment 88/72482 DC

Amendments issued since publication

Amd. No.	Date	Comments
8415	January 1997	
9489	May 1997	
10573	December 1999	Indicated by a sideline

ISBN 0 580 21180 0

Contents

	Page
Cooperating organizations	Inside front cover
National foreword	ii
Foreword	2
Text of EN 203-1:1992	5
National annex NA (informative) Committees responsible	Inside back cover
National annex NB (informative) Cross-references	Inside back cover

National foreword

This British Standard has been prepared under the direction of the Gas Standards Policy Committee and is the English language version of EN 203-1 *Gas heated catering equipment — Part 1: Safety requirements*, published by the European Committee for Standardization (CEN).

It supersedes BS 5314, which is withdrawn.

EN 203-1, incorporating Amendments Nos. 1, 2 and 3 was produced as a result of international discussion in which the UK took an active part.

The terms “reduced (calorific) rate” and “nominal (calorific) rate” are used in the text of this European Standard. A proposal to replace these throughout by “reduced (heat) input” and “nominal (heat) input” has been submitted to CEN Central Secretariat.

Conformance of equipment to this standard does not ensure that the equipment satisfies all the requirements of EC directives; users should be aware that a CEN Technical Board resolution has been put forward for future amendments to include additional requirements.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 71 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Sidelining in this document indicates the most recent changes by amendment.

UDC 641.534.06:64.022.026:620.1:614.8
ICS 97.020; 97.040.20

Descriptors: Communal equipment, gas appliances, cooking devices, safety requirements, equipment specifications, performance evaluation, burners, gas permeability tests, performance tests, technical notices, marking

English version

Gas heated catering equipment — Part 1: Safety requirements

(includes amendments A1:1995 and A2:1999)

Appareils de cuisine professionnelle utilisant
les combustibles gazeux —
Partie 1: Règles générales de sécurité
(inclut les amendements A1:1995 et A2:1999)

Großküchengeräte für gasförmige
Brennstoffe —
Teil 1: Allgemeine Festlegungen für die
Sicherheit
(enthält Änderungen A1:1995 und A2:1999)

This European Standard was approved by CEN on 1992-07-31, amendment A1 was approved by CEN on 1994-12-16, and amendment A2 was approved by CEN on 1997-08-21. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

The standard prEN 203 drawn up by the MARCOGAZ-EFC EM-CL 11 Liaison Commission “Large scale kitchen gas appliances” was directly submitted to a preliminary vote of the CEN members up until the 15th May 1983.

This document having been the subject of numerous comments, the CEN Central Secretariat and MARCOGAZ proposed, by mutual agreement, that these comments be dealt with by the CL 11 reporting group.

The latter, having been unable to solve a good number of these comments, prompted the Technical Committee CEN/TC 106 to meet in Paris on 11th June 1987. Considering the work currently in hand at the CEN, CEN/TC 106 decided to submit to a new CEN Public Enquiry a draft standard drawn up by the EFCEM which is limited to safety aspects and based on the initial draft.

National standards identical to this European Standard shall be published, and conflicting national standards shall be withdrawn at the latest by the end of February 1993.

According to the common CEN/CENELEC Rules, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Introduction

This standard specifies the safety of commercial catering appliances. BS EN 203-2:1995 deals with rational use of energy and a third Part is proposed to deal with fitness for purpose.

Foreword to amendment A1

This amendment has been prepared by the Technical Committee CEN/TC 106, Large kitchen appliances using gaseous fuels, of which the secretariat is held by AFNOR.

This amendment has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

This amendment shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 1996, and conflicting national standards shall be withdrawn at the latest by March 1996.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this amendment: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Foreword to amendment A2

This amendment EN 203-1:1992/A2:1999 to EN 203-1:1992 has been prepared by Technical Committee CEN/TC 106, Large kitchen appliances using gaseous fuels, the Secretariat of which is held by AFNOR.

This amendment to the European Standard EN 203-1:1992 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 1999, and conflicting national standards shall be withdrawn at the latest by September 1999.

This amendment to the European Standard EN 203-1:1992 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Contents

	Page
Foreword	2
1 General	5
1.1 Scope	5
1.2 Normative references	5
1.3 Definitions	6
1.4 Classification	12
2 Constructional requirements	14
2.1 General	14
2.2 Special requirements for components in the gas circuit	18
2.3 Particular requirements	20
3 Performance requirements	21
3.1 General	21

	Page		Page	
3.2	Soundness	21	Figure 3 — Combustion test — Sampling hood for pan sizes 22 cm to 34 cm	45
3.3	Obtaining the gas rate	21		
3.4	Operational safety	22	Figure 4 — Combustion test — Sampling hood for pan sizes 38 cm to 50 cm	46
3.5	Auxiliary equipment	24	Figure 5 — Characteristics of the pans needed for the tests	47
3.6	Combustion	24		
3.7	Particular requirements	24	Figure 6 — Equipment for wind testing	47
4	Test conditions	25	Figure 7 — Arrangement of the equipment for wind testing	48
4.1	General	25		
4.2	Soundness	29	Figure 8 — Combustion products evacuation safety device	49
4.3	Obtaining the gas rates	30		
4.4	Operational safety	32	Figure 9 — Sampling of combustion products by rings — Principles of construction	50
4.5	Auxiliary equipment	36	Figure 10 — Sampling probe for appliances with a mitre	52
4.6	Combustion	37		
4.7	Particular tests	39	Figure 11 — Sampling probe for appliance of type A and B with a chimney	54
5	Designation	40		
6	Marking	40	Table 1 — Classification of gases	12
6.1	Marking on the appliance	40	Table 2 — Maximum shut-down times in relation to the blockage	23
6.2	Instructions	41		
6.3	Marking packaging	42	Table 3 — Test gases corresponding to the appliance categories	25
Annex A (informative)	National situations	56		
Annex B (informative)	Guidelines for extension to other categories	66	Table 4 — Characteristics of the test gases: dry gas at 15 °C and 1013,25 mbar	27
Annex C (informative)	Identification of conformity of EN 203-1 to the essential requirements of the Gas Appliance Directive	66	Table 5 — Calorific values of test gases of the third family	28
			Table 6 — Test pressures	30
			Table 7	37
Annex D (informative)	Trilingual list of appliances entering into the scope of EN 203-1	68	Table A.1.1 — Single categories marketed	57
Annex ZA (informative)	Clauses of this European Standard EN 203-1/A2 addressing essential requirements or other provisions of EU Directives	68	Table A.1.2 — Dual categories marketed	58
			Table A.2 — Normal supply pressures	58
			Table A.3 — Test gases corresponding to the nationally or locally marketed categories	60
Figure 1 — Apparatus for testing soundness		43	Table A.4.1 — Test gases corresponding to national or local situations: dry gas, at 15 °C and 1013,25 mbar	63
Figure 2 — Test on an appliance of type B ₁₁ and B _{11BS} under abnormal draught conditions		44	Table A.4.2 — Percentage of CO ₂ (dry neutral combustion products)	62
			Table A.5 — Types of connection used in various countries	65
			Table A.6 — Diameters of flues used in various countries	65
			Table C.1 — Symbolization of gas nature	66
			Table ZA.1	69

1 General

1.1 Scope

This standard specifies the requirements for the construction and operating characteristics relating to the safety¹⁾ of gas heated appliances for catering which have atmospheric induction burners. It also sets out the appropriate test conditions for the control of these characteristics.

Only type A, B₁₁ and B₁₁BS appliances, as defined in 1.4.3, are considered in this standard.

This standard applies to all gas heated catering preparation and cooking appliances, with the following exceptions:

- appliances with total pre-mix burners;
- type B₂ appliances (without draught diverter).

This standard covers type tests only.

Annex D, informative, lists the main types of equipment entering into the field of application of this standard.

1.2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 88:1991, *Pressure governors for gas appliances for inlet pressures up to 200 mbar*.

EN 125:1991, *Flame supervision devices for gas-burning appliances — Thermoelectric types*.

EN 257:1992, *Mechanical thermostats for gas-burning appliances*.

EN 298:1993, *Automatic burner control systems for gas burners and gas-burning appliances with or without fans*.

EN 437:1993, *Test gases — Test pressures — Categories of appliance*.

EN 60335-1:1991, *Safety of household and similar electrical appliances — General requirements*.

EN 730-201/91, *Automatic electrical control devices for household and similar use — Part 2: Particular requirements for electrical control devices for household electrical appliances*.

EN ISO 3166-1:1997, *Codes for the representation of countries and their subdivisions — Country codes (ISO 3166-1)*.

ISO 7-1:1982, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Designation, dimensions and tolerances*.

ISO 228-1:1982, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Designation, dimensions and tolerances*.

ISO 301:1981, *Zinc alloy ingots intended for casting*.

ISO/DIS 6976:1992, *Natural gas — Calculation of calorific value, density and relative density*.

¹⁾ The term “safety” includes not only the safety of the appliances’ gas line but also that of the overall cooking appliance during its normal use in catering.

1.3 Definitions

1.3.1 Terminology referring to gases and pressures

1.3.1.1 test gases

gases intended for the verification of the operational characteristics of appliances using combustible gases. They consist of reference gases and limit gases. Table 3 of this standard gives the characteristics of reference gases and limit gases

1.3.1.1.1

reference gases

test gases with which appliances operate under nominal conditions when they are supplied at the corresponding normal pressures

1.3.1.1.2

limit gases

test gases representative of the extreme variations in the characteristics of the gases for which the appliances have been designed

1.3.1.2

reference conditions

15 °C, 1013,25 mbar, unless otherwise specified

1.3.1.3

density

the ratio of the masses of equal volumes of dry gas and dry air under the same temperature and pressure conditions: 15 °C, 1013,25 mbar.

Symbol: d

1.3.1.4

calorific value

the quantity of heat produced by the complete combustion, at a constant pressure equal to 1013,25 mbar, of unit volume or mass of gas, the constituents of the combustible mixture being taken at reference conditions and the products of combustion being taken under the same conditions.

There are two types of calorific value:

— gross calorific value: the water produced by combustion is assumed to be condensed.

Symbol: H_g

— net calorific value: the water produced by combustion is assumed to remain in the vapour state.

Symbol H_i

In this standard, only the net calorific value is used.

Units:

— either megajoules per cubic metre of dry gas at the reference conditions (MJ/m^3)

or megajoules per kilogram of dry gas (MJ/kg).

1.3.1.5

Wobbe number

the ratio of the calorific value of the gas per unit volume to the square root of its relative density under the same reference conditions. The Wobbe number is said to be gross or net according to whether the gross or net calorific value is used. Symbol: gross Wobbe number: W_g ; net Wobbe number: W_i

Units:

— either megajoules per cubic metre of dry gas at reference conditions (MJ/m^3)

— or megajoules per kilogram of dry gas (MJ/kg).

In this standard, only the net Wobbe number is used

1.3.1.6 test pressures

gas pressure used to verify the operational characteristics of appliances using combustible gases. They consist of normal and limit pressures. The test pressures are given in Table 5. Unit: millibar (mbar).

NOTE 1 mbar = 10^2 Pa.

1.3.1.6.1

normal pressure

the pressure under which the appliances operate in nominal conditions when they are supplied with the corresponding reference gas. Symbol p_n

1.3.1.6.2

limit pressures

pressures representative of the extreme variations in the appliance supply conditions.

Symbols: Maximum pressure: $p_{\max}$; minimum pressure: $p_{\min}$

1.3.1.7

pressure couple

combination of two distinct gas distribution pressures applied by reason of the significant difference existing between the Wobbe numbers within a single family or group in which:

- the higher pressure corresponds only to the gases of low Wobbe number;
- the lower pressure corresponds to gases of high Wobbe number.

1.3.1.8

gas supply pressure

difference between the static pressure measured at the inlet connection of the appliance, with the appliance in operation, and atmospheric pressure

Symbol: p

Unit: millibar

1.3.2 General terminology referring to appliance design

1.3.2.1 Terminology referring to the gas circuit

1.3.2.1.1

gas circuit

the part of the appliance between the gas inlet connection and the burner(s), which conveys or contains the gas

1.3.2.1.2

inlet connection

the part of the appliance which is intended to be connected to the gas supply

1.3.2.1.3

mechanical soundness joint (or mechanical means of obtaining soundness)

an assembly of several parts, generally metallic, which achieves soundness by the use of mechanical means such as metal-to-metal joints, toroidal sealing rings ("O" rings) or flat joints

1.3.2.1.4

restrictor or calibrated orifice

a device with one or more orifices that is placed in the path of the gas flow between the appliance inlet connection and the burner, so as to create a pressure drop and thus reduce the gas pressure at the burner to a predetermined value for a given supply pressure and rate

1.3.2.1.5

gas rate adjuster

a component which allows the gas input to each burner to be set at a predetermined value according to the supply conditions.

Adjustment may be continuous (screw adjuster) or discontinuous (changing restrictors).

The adjusting screw of an adjustable governor is regarded as a gas rate adjuster.

The operation of setting this device is called “setting the gas rate”

1.3.2.1.6

gas rate control

a tap or equivalent component which allows the gas supply to one or more burners to be opened or closed, and, possibly, the burner or burners to be adjusted to gas inputs lower than the nominal rate

1.3.2.1.7

aeration adjuster

a device which allows the aeration of a burner to be set at a desired value, according to the supply conditions.

The operation of changing the setting of the device is called “adjusting the primary aeration”

1.3.2.1.8

injector

a component which admits the gas into an atmospheric burner

1.3.2.2 Terminology referring to the burner

1.3.2.2.1

atmospheric induction burner

a burner in which part of the air necessary for combustion, called primary air, is entrained by the gas flow and is mixed upstream of the burner. The remainder of the air, called secondary air, is taken up downstream of the burner

1.3.2.2.2

main burner

a burner which effects the heating function of the appliance and is often called simply a “burner”

1.3.2.2.3

ignition burner or pilot

a burner of low rate which lights the main burner. If a burner operates independently of the main burners, it is called a “pilot”

1.3.2.3 Terminology referring to the combustion products circuit

1.3.2.3.1

combustion chamber

an enclosure in which the air/gas mixture burns

1.3.2.3.2

flue outlet

the part of the appliance intended to be connected to the flue

1.3.2.3.3

draught diverter

a device placed in the combustion product circuit, which is intended to reduce the influence of down-draught on the burner performance and combustion

1.3.2.3.4

combustion products outlet or flueway extension

the part of an appliance not connected to a flue, through which products of combustion are discharged into the room

1.3.2.3.5**combustion products discharge control device**

a device that causes at least shut-down of the main burner when there is an unacceptable spillage of combustion products from the draught diverter of type B_{11BS} appliances

1.3.2.4 Auxiliary equipment

All the accessory devices of an appliance which act directly or indirectly on the gas rate: gas rate control, flame supervision device, governor, thermostat, etc.

1.3.2.4.1 ignition device

Any means used to light gas admitted to the ignition burner or main burner.

This device can be intermittent or permanent.

1.3.2.4.1.1**intermittent ignition device**

any means, fixed to the appliance or not, which assures ignition of the initial flow of gas only to the ignition burner or main burner

1.3.2.4.1.2**permanent ignition device**

any means which, at any time when the gas rate controls are open, assures ignition or reignition of the gas admitted to the ignition burner or main burner

1.3.2.4.2 flame supervision device

a device which, on the disappearance of the supervised flame, shuts off the gas supply.

It is described as having “simple control” if it shuts off the gas supply to the main burner only.

It is described as having “complete control” if it shuts off the gas supply to the main burner and to the ignition burner.

1.3.2.4.2.1**opening time**

the time interval between the ignition of the supervised flame and the moment when the force thus produced is sufficient to keep the valve open

1.3.2.4.2.2**ignition safety time**

the time interval between the signal to open the valve admitting the gas and the shut off of the gas supply to the burner if ignition does not take place

1.3.2.4.2.3**extinction safety time (extinction delay time)**

the time interval between the extinction of the supervised flame and shut off of the gas supply:

- to the main burner (simple control);
- and possibly to the ignition burner and/or the pilot (complete control).

1.3.2.4.2.4**flame supervision burner**

a burner which acts on a flame detector

1.3.2.4.2.5**flame detector**

the part of the flame supervision device sensing element on which the supervised flame acts directly and transforms the flame effect into a signal which is transmitted directly or indirectly to a shut off valve

1.3.2.4.3**pressure governor**

a pressure governor is a device which maintains a constant downstream pressure within a fixed range, independent of the upstream pressure and/or gas rate

1.3.2.4.4**temperature regulator (thermostat)**

a device which controls the performance of the appliance (by on/off, on/low or modulating control), maintaining a predetermined temperature within the given limits of operation

1.3.2.4.5**overheat limit device**

a manually reset device which enables a temperature to be limited to a predetermined safe value

1.3.2.4.6**control knob**

a component which is moved by hand and operates an appliance control (for example, tap, thermostat, etc.)

1.3.3 Terminology referring to appliance operation**1.3.3.1 Terminology referring to gas rates****1.3.3.1.1****heat input**

the quantity of energy used in unit time corresponding to the volumetric or mass flow rates, the calorific value used in this standard being the net calorific value

Symbol: Q

Unit: kilowatt (kW)

1.3.3.1.2**nominal heat input**

the value of the heat input declared by the manufacturer

Symbol: Q_n

Unit: kilowatt (kW)

1.3.3.1.3**mass flow rate**

the mass of gas consumed by the appliance in unit time during continuous operation

Symbol: M

Units: kilograms per hour (kg/h), or grams per hour (g/h)

1.3.3.1.4**volumetric flow rate**

the volume of gas consumed by the appliance in unit time during continuous operation, the gas being taken at reference conditions

Symbol: V

Unit: cubic metres per hour (m³/h), litres per minute (l/min), cubic decimetres per hour (dm³/h) or cubic decimetres per second (dm³/s)

1.3.3.2 Terminology referring to gas combustion**1.3.3.2.1****combustion**

combustion is said to be “complete” if there are no more than traces of combustible constituents (hydrogen, hydrocarbons, carbon monoxide, carbon, etc.) in the products of combustion.

On the other hand, combustion is said to be “incomplete” if at least one combustible constituent is present in significant proportions in the products of combustion.

It is the amount of carbon monoxide (CO) in the dry, air-free products of combustion which is used as the criterion to distinguish between “satisfactory” and “unsatisfactory” combustion.

The maximum CO limits according to the circumstances of the test are defined in **3.6**. In each case, combustion is regarded as complete if the CO content is below the maximum allowed; if not, it is regarded as incomplete

1.3.3.2.2**aerated flame**

the flame produced by the combustion of gas previously mixed with air

1.3.3.2.3**non-aerated flame**

the flame produced by the combustion of gas which comes into contact with air at the moment of its combustion

1.3.3.2.4**flame stability**

the condition of the flames firmly attached to the burner ports or the flame contact area provided by the design, with no risk of flame lift or light-back

1.3.3.2.5**flame lift**

a phenomenon characterized by the total or partial lifting of the base of the flame from the burner port or the flame contact area provided by the design. Flame lift may cause the extinction of the flame

1.3.3.2.6**light-back**

a phenomenon characterized by the return of the flame into the body of a burner

1.3.3.2.7**light-back at the injector**

a phenomenon characterized by the ignition of the gas at the injector, either as a result of the flame returning into the burner or by the propagation of a flame around the outside of the burner

1.3.3.2.8**sooting**

a phenomenon appearing with incomplete combustion and characterized by deposits of soot on the surfaces or parts of the appliance in contact with the products of combustion or with the flame

1.3.3.2.9**aeration rate**

the ratio of the air rate entrained at the burner to the minimum air rate necessary for complete combustion

1.3.3.3**putting an adjuster or control device out of action**

an adjuster or control device (of rate, pressure, etc) is said to be put out of action when it is rendered inoperative and is sealed in that position. The appliance behaves as though the device had been removed

1.3.3.4**sealing an adjuster**

if an adjuster is locked by means of a material such that any attempt to change its setting causes breakage of the material and makes the interference of the adjuster apparent, the adjuster is said to be sealed in its adjustment position.

An adjuster which is sealed in the fully open position is considered to be non-existent

1.3.3.5**nominal vapour pressure**

maximal vapour pressure indicated by the manufacturer for the safe use of pressurized parts of the equipment

1.3.3.6**direct destination country**

country for which the equipment was certified and where it is specified by the manufacturer as being the scheduled country of destination. At the time of putting on the market and/or installation, the equipment must be capable of operating, without any additional adjustment or modification, with one of the gases distributed in the country concerned, at the appropriate distribution pressure.

More than one country can be specified if the equipment, in its current state of adjustment, can be used in each of these countries

1.3.3.7**indirect destination country**

country for which the equipment was certified but for which it is not adapted as it is currently set up. Additional modifications or supplemental adjustments should be made to the equipment for it to be used correctly and safely in this country

1.4 Classification

Appliances are divided:

- into categories defined according to the nature of the gases and pressures for which they are designed; the definition of the categories follows from **1.4.2.1**, **1.4.2.2** and **1.4.2.3**;
- into types, according to the method of evacuating the products of combustion and admission of the combustion air; the different types of appliance covered by this standard are listed in **1.4.3**.

1.4.1 Classification of gases

Gases are classified according to three families, each of which may be divided into groups according to Wobbe number. Table 1 shows the families and groups of gases used in the standard.

Table 1 — Classification of gases

Families and groups of gases	Net Wobbe number (W_i) and gross Wobbe number (W_s) at 15 °C and 1013,25 mbar MJ/m ³			
	Minimum		Maximum	
	W_i	W_s	W_i	W_s
First family				
Group a	19,5	22,4	21,7	24,8
Second family	35,2	39,1	49,6	54,7
Group H	41,2	45,7	49,6	54,7
Group L	35,2	39,1	40,5	44,8
Group E	36,9	40,9	49,6	54,7
Third family	68,2	72,9	80,5	87,3
Group B/P	68,2	72,9	80,5	87,3
Group P	68,2	72,9	70,6	76,8

1.4.2 Categories of appliance

In each country, taking into account the local gas distribution conditions (gas composition and supply pressures), only certain of the categories defined in **1.4.2.1**, **1.4.2.2** and **1.4.2.3** are marketed.

The circumstances concerning the marketing of these categories of appliance in each country and the corresponding supply pressures are given in Table A.1 and Table A.2 (see also **A.3** for the particular categories marketed locally and nationally corresponding to the particular gases and supply pressures given in Table A.4).

Annex B gives guidelines for extension to other categories.

1.4.2.1 Category I

Appliances of category I are designed exclusively for the use of gases of a single family or of a single group.

1.4.2.1.1 Appliances designed for use with first family gases only

Category I_{1a}: appliances using only gases of group a of the first family at the prescribed supply pressure (this category is not used).

1.4.2.1.2 Appliances designed for use with second family gases only

Category I_{2H}: appliances using only gases of group H of the second family, at the prescribed supply pressure.

Category I_{2L}: appliances using only gases of group L of the second family, at the prescribed supply pressure.

Category I_{2E}: appliances using only gases of group E of the second family, at the prescribed supply pressure.

Category I_{2E+}: appliances using only gases of group E of the second family and operating with a pressure couple without intervention on the appliance. The gas pressure regulator of the appliance, where one exists, is not operative in the range of the two normal pressures of the pressure couple.

1.4.2.1.3 Appliances designed for use with third family gases only

Category I_{3B/P}: appliances capable of using gases of the third family (propane and butane) at the prescribed supply pressure.

Category I₃₊: appliances capable of using gases of the third family (propane and butane) and operating with a pressure couple without intervention on the appliance other than adjustment of the primary air intake for changing from butane to propane and vice versa. No operating gas pressure regulator is permitted on the appliance.

Category I_{3P}: appliance using only gases of group P of third family (propane) at the prescribed supply pressure.

1.4.2.2 Category II

Appliances of category II are designed for use with gases from two families.

1.4.2.2.1 Appliances designed for use with gases of the first and second families

Category II_{1a2H}: appliances capable of using gases of group a of the first family and gases of group H of the second family. Gases of the first family are used under the same conditions as for category I_{1a}. Gases of the second family are used under the same conditions as for category I_{2H}.

1.4.2.2.2 Appliances designed for use with gases of the second and third families

Category II_{2H3B/P}: appliances capable of using gases of group H of the second family and gases of the third family. Gases of the second family are used under the same conditions as for category I_{2H}. Gases of the third family are used under the same conditions as for category I_{3B/P}.

Category II_{2H3+}: appliances capable of using gases of group H of the second family and gases of the third family. Gases of the second family are used under the same conditions as for category I_{2H}. Gases of the third family are used under the same conditions as for category I₃₊.

Category II_{2H3P}: appliances capable of using gases of group H of the second family and gases of group P of the third family. Gases of the second family are used under the same conditions as for category I_{2H}. Gases of the third family are used under the same conditions as for category I_{3P}.

Category II_{2L3B/P}: appliances capable of using gases of group L of the second family and gases of the third family. Gases of the second family are used under the same conditions as for category I_{2L}. Gases of the third family are used under the same conditions as for category I_{3B/P}.

Category II_{2L3P}: appliances capable of using gases of group L of the second family and gases of group P of the third family. Gases of the second family are used under the same conditions as for category I_{2L}. Gases of the third family are used under the same conditions as for category I_{3P}.

Category II_{2E3B/P}: appliances capable of using gases of group E of the second family and gases of the third family. Gases of the second family are used under the same conditions as for category I_{2E}. Gases of the third family are used under the same conditions as for category I_{3B/P}.

Category II_{2E+3B/P}: appliances capable of using gases of group E of the second family and gases of the third family. Gases of the second family are used under the same conditions as for category I_{2E+}. Gases of the third family are used under the same conditions as for category I_{3B/P}.

Category II_{2E+3+}: appliances capable of using gases of group E of the second family and gases of the third family. Gases of the second family are used under the same conditions as for category I_{2E+}. Gases of the third family are used under the same conditions as for category I₃₊.

Category II_{2E+3P}: appliances capable of using gases of group E of the second family and gases of group P of the third family. Gases of the second family are used under the same conditions as for category I_{2E+}. Gases of the third family are used under the same conditions as for category I_{3P}.

1.4.2.3 Category III

Appliances of category III are designed for use with gases of all three families.

This category is not in general use.

The category III appliances accepted in specific countries are given in Annex A (see A.3).

1.4.3 Methods of evacuation of combustion products

The types of appliance covered by the scope of this standard are defined as follows:

Type A

An appliance not intended to be connected to a flue or other device for evacuating the combustion products to the outside of the room in which it is installed.

These appliances shall be installed with sufficient ventilation to prevent the formation of unacceptable concentrations of substances harmful to health in the room in which they are installed.

This requirement shall be stated in the installation instructions.

Type B

An appliance intended to be connected to a flue for evacuating the combustion products to the outside of the room, with the combustion air being drawn directly from the room in which the appliance is installed.

Type B₁: a type B appliance incorporating a draught diverter in the combustion products circuit.

Type B₁₁: a natural draught type B₁ appliance.

Type B₁₁: appliance fitted with a combustion products discharge control device are identified by an additional index BS (type B₁₁BS).

Type B₂: appliances which are not fitted with a draught diverter in the combustion products circuit, are not considered to be within the scope of this standard.

2 Constructional requirements

2.1 General

Unless otherwise stated, the constructional requirements shall be verified by inspection.

2.1.1 Conversion to different gases

In view of the definitions given in 1.3.2, 1.3.3 and 1.4, the only acceptable operations for converting from the gas of one group or family and/or for adapting to the different supply pressures of a gas are given below for each category.

It is recommended that these operations should be possible without having to disconnect the appliance.

2.1.1.1 Category I

- Categories I_{2H}, I_{2L}, I_{2E}, I_{2E+}: no adjustment to the appliance;
- Category I_{3B/P}: no adjustment to the appliance;
- Category I₃₊: change of injectors or restrictors but only to convert from one pressure couple to another (e.g. 28-30/37 mbar $\leftrightarrow$ 50/67 mbar). Adjustment of the primary aeration to convert from one pressure couple to another, or to convert from one pressure to another within the same pressure couple.
- Category I_{3P}: no adjustment to the appliance for a change of gas. For a change of pressure, change of injectors, adjustment of gas rates.

2.1.1.2 Category II

2.1.1.2.1 Categories of appliance designed for use with gases of the first and second families

- change of injectors or restrictors;
- adjustment of gas rate for first family gases;

- adjustment of primary aeration;
- change of complete pilots or of some of their parts;
- adjustment of the governor downstream pressure, or putting the governor out of service in accordance with 2.2.2.3;
- putting the gas rate adjuster out of service for second family gases.

These adjustments are only permitted for converting from a first family gas to a second family gas or vice versa.

2.1.1.2.2 Categories of appliance designed for use with second and third family gases

- change of injectors or restrictors;
- adjustment of primary aeration;
- adjustment of the governor downstream pressure, or putting the governor out of service, in accordance with 2.2.2.3.

These adjustments or component changes are only permitted

- for converting from a gas of one family to a gas of another family;
- within the third family, for converting from one butane/pressure couple to another (e.g. 28-30/37 mbar $\leftrightarrow$ 50/67 mbar).

For third family gases, when converting from one gas to the other within a pressure couple, adjustment of the primary aeration only is permitted.

2.1.1.3 Category III

The adjustments or component changes permitted for converting from a gas of one family to a gas of another family, or for converting from one butane/propane pressure couple to another are as follows:

- change of injectors or restrictors;
- adjustment of gas rate for first family gases;
- adjustment of primary aeration;
- change of complete pilots or of some of their parts;
- adjustment of the governor downstream pressure, or putting the governor out of service in accordance with 2.2.2.3;
- putting the gas rate adjuster out of service for third family gases.

For third family gases, when converting from one gas to another within the same pressure couple, adjustment of primary aeration only is permitted.

2.1.2 Materials and methods of construction

The quality and thickness of the materials used in the construction of the appliances shall be such that the constructional and operational characteristics are not altered with use. In particular, all parts of the appliance, when installed in accordance with the instructions and accepted practice, shall withstand the mechanical, chemical and thermal actions to which they may be exposed during operation: in particular

- condensation produced at start-up and/or during operation of the appliance shall not affect the safety;
- any corrosion shall not give rise to a disturbance which might affect safety.

In addition, the parts shall be constructed and assembled in such a way that the constructional characteristics which affect appliance safety are not altered in the course of normal use and under normal conditions of installation and maintenance.

All pressurized parts of the appliance shall be designed and constructed so that they withstand the mechanical and thermal conditions to which they are subjected, without this affecting safety.

Materials containing asbestos shall not be used in the construction of the appliance.

Zinc alloys may only be used in contact with gas if they are of quality ZnAl₄ as defined in ISO 301:1981 and if the parts are not likely to be exposed to a temperature greater than 80 °C, under the conditions of 4.6.

For the main valve inlet and outlet connections, only external threads as specified in ISO 228-1 are permitted if they are made of zinc alloy.

2.1.3 Use and day-to-day maintenance

Parts which may be removed during day-to-day maintenance shall be designed or marked so that they can be reassembled easily and in complete safety in the correct position and without risk of mistake (for example, components of the gas line, burner and where necessary the combustion products circuit described in the manufacturer's instructions).

The user shall have safe access to every control knob, button, etc. necessary for the normal use of the appliance, after opening a door if necessary but without having to remove any part of the case.

The user shall be able to clean the appliance easily. In particular, it shall be possible to carry out, without the use of a tool, all the operations of removal and reassembly of parts which are described in the instructions for use and maintenance.

Unless they are fitted with an electrical interlock which cuts the supply to motorized parts, it shall not be possible to loosen the protective covers of removable parts without the aid of a tool.

2.1.4 Gas connections

The connection point shall be easily accessible and allow free range to tightening tools.

For all the appliances, the inlet connections shall have a thread which complies with ISO 228-1 or with ISO 7-1 or shall have a compression fitting. In the first case, the end of the inlet connection shall be sufficiently flat to allow the use of a sealing device.

The pipe carrying the inlet connection shall be fixed to the appliance body in a rigid fashion. However, for an appliance in category I₃, it is not mandatory to make the connection by means of a threaded joint or a compression fitting, it may also be made by a conical joint or by a flat joint. The types of connection used in the various countries are given in A.5 (Table A.5).

2.1.5 Soundness

2.1.5.1 Soundness

The sealing compounds shall be suitable for contact with the gas and for the mechanical and thermal conditions to which they are subjected.

Holes for screws, studs, etc. intended for the assembly of non-gas-carrying parts shall not open into gasways.

Pipework to the movable parts of the appliance and subject to strain by mechanical movement shall comply with the tests given in clause 4.2.1 to guarantee their operation (soundness, rate).

2.1.5.1.1 Assemblies designed to be dismantled

The soundness of parts and assemblies placed in the gas circuit and likely to be dismantled for routine maintenance in situ shall be achieved by means of mechanical joints, e.g. metal-to-metal joints, packing or "O" ring joints, i.e. not necessitating the use of sealing compounds such as tape, paste or liquid.

This soundness shall be assured even after several sequences of disconnection and reassembly according to the test conditions given in 4.2.1.

2.1.5.1.2 Permanent assemblies

Where sealing compounds specified in 2.1.5.1.1 are used for permanent assemblies, they shall remain effective under normal conditions of appliance use.

The soundness of the "gas" circuit assemblies shall not be achieved by means of solder which has a melting point range with a lower limit below 450 °C after application.

2.1.5.2 Soundness of the combustion products circuit

The means used to prevent leakage of the combustion products from the normal circuit designed by the manufacturer shall be such that they do not deteriorate under normal conditions of appliance use and maintenance.

2.1.6 Supply of combustion air and evacuation of combustion products

Appliances shall be constructed so that, under the normal conditions of use and maintenance, the supply of combustion air and the evacuation of combustion products is permanently guaranteed. The cross-section of the air passage to the combustion chamber and of the combustion products passage, determined by the construction, shall neither be adjustable nor be obstructed during installation.

2.1.6.1 Appliances not intended to be connected to a flue (type A)

The openings provided to evacuate the products of combustion shall be designed and placed so that they cannot be obstructed unintentionally by a wall in contact with the appliance and the possibility of their being obstructed by food or utensils is avoided.

2.1.6.2 Appliances intended to be connected to a flue (type B₁₁ and B_{11BS})

Appliances designed to be connected to a flue shall be equipped with a draught diverter.

The flue socket shall be female and allow connection to be made to an evacuation line, the diameter of which must comply with the standards which apply in the countries where the appliance is to be installed.

Its diameter shall be equal to or greater than the values given in annex A.6 (Table A.6).

The manufacturer may supply a special adaptor for connection purposes.

The evacuation pipe shall be able to be inserted for a length of 15 mm into the evacuation socket. The jointing of evacuation pipes shall not impair the evacuations of combustion products. Compliance is ensured by visual examination.

2.1.6.3 Combustion products discharge safety device for type B_{11BS} appliances

The safety device shall form an integral part of the type B_{11BS} appliance. It shall withstand the thermal, mechanical and chemical effects arising in the course of normal use or normally foreseeable use.

The safety device shall not be adjustable. Any adjusting components shall be sealed by the manufacturer.

The safety device shall be designed such that it cannot be dismantled without a tool.

2.1.7 Operation of the burner

2.1.7.1 Verification by the installer

The installer shall be able to check the ignition of the burner assembly, if necessary after removal of a case or opening a door, on condition that this operation does not modify the performance of the burner.

2.1.7.2 Confirmation by the user

The user shall be able, at any time and without any dismantling, to confirm that the burner is operating, either:

- by a direct check of the presence of at least a portion of the flame; or
- by any other indirect means, provided that any fault occurring in this means can be rapidly detected and rectified.

2.1.8 Auxiliary energy

If the appliance is designed to supply with auxiliary energy (electricity, fluid under pressure, etc.), then its design shall be such that no dangerous situation can arise

- in the event of normal fluctuation in the auxiliary energy ($+10\%$ -15%): the appliance shall continue to operate safely;
- in the event of abnormal fluctuation in the auxiliary energy (outside the range $+10\%$ -15%): the appliance shall continue to operate safely or shall go to standby or shut-down;
- if failure of the auxiliary energy causes the appliance to shutdown: restoration of the auxiliary energy shall not lead to an unsafe condition.

Electrical equipment of the appliance shall meet the relevant requirements of EN 60335-1, with the following exceptions.

Protection against electric shock is not necessary for high voltage ignition devices if the energy of each pulse, the number of pulses and the interval between each pulse comply with the limits fixed by CEN/TC 58 in collaboration with CENELEC.

If automatic electrical safety and regulating devices are part of the electrical equipment, their safety shall meet the relevant requirements of IEC 730-2-1.

If the appliance is fitted with electronic components or systems which provide a safety function, they shall comply with the relevant requirements of EN 60730-2-1, type 2, Control devices, taking into account the levels of immunity, and electromagnetic compatibility specified in EN 298:1992.

2.2 Special requirements for components in the gas circuit

Components shall comply with the relevant European Standards.

All parts of the appliance which are installed or adjusted by the manufacturer or his agent, and which are not intended to be adjusted by the user or installer, shall be appropriately protected. Paint may be used for this purpose provided that it withstands the temperature to which it is subjected during normal operation of the appliance.

2.2.1 Gas rate controls

2.2.1.1 Shut-off device

Each burner or group of burners capable of cross-lighting shall be controlled by a shut-off device enabling the gas supply to be shut off at will.

In all cases, all the burners designed to operate simultaneously without cross-lighting may be controlled by a common shut-off device on condition that each of them be protected by a flame detector device.

The operation of the shut-off device may be manual or automatic but the shut-off shall be effected without delay; for example, it shall not be subject to the inertia time of a safety device.

The shut-off device should preferably be a plug tap, having:

- an automatic spring loaded mechanism to allow adjustment between the plug and the body;
- two stops, one at the closed position and the other at the end of the travel.

For burners controlled by a thermostat, a reduced rate position for the gas rate control shall be allowed only if the tap and thermostat are controlled by a single control.

The plug-taps shall have:

- an automatic spring loaded mechanism to allow for wear between the plug and the body;
- two stops, one in a closed position and one at the end of the travel.

The reduced heat input can be obtained:

- either at the end of travel of the tap; or
- in an intermediary position between the closed position and the fully open position.

On an appliance, all the valves controlling the same kind of burner shall be of the same type, that is, with reduced calorific rate either at the end of the travel or between the closed and full-flow positions.

Needle taps shall not be used.

2.2.1.2 Control knobs

The various positions of the gas rate control shall be marked indelibly and clearly.

The closed position shall be marked by a solid disk or a circle at least 3 mm in diameter: ● or ○

For the other positions, the following symbols can be used:

- full on (burner):  large flame;
- reduced reat (if any):  small flame.

Symbols other than letters may be accepted as long as they clearly give equivalent information and their meaning is explained in the manuals.

Complementary markings are authorized as long as they do not generate any confusion for the equipment user.

Any specific position of the control tap provided for ignition and/or any special knob to be operated for ignition, shall be identified by a stylized star.

However, when a single button controls a flame supervision device with complete control of the burner and pilot, no markings are required if incorrect operation is not possible.

The control knobs shall be designed and placed so that they can neither be mounted incorrectly nor move by themselves.

If there are several gas rate controls, the knobs shall be clearly distinguished with relation to which burners they control.

2.2.2 Auxiliary equipment

The auxiliary equipment shall be chosen in relation to its use (for example, temperature, nature of the gases which can be used, etc.) and shall be mounted in such a way that it cannot be damaged or blocked during normal use of the appliance. Accessibility shall be such as to permit easy cleaning.

2.2.2.1 Ignition device

Main burners and pilots ignited by direct manual ignition shall be capable of being lit in a simple way.

The burners and their ignition devices shall be designed and located so as to ensure the correct cross-lighting of all burner parts.

2.2.2.2 Flame supervision device

2.2.2.2.1 General

The flame supervision device shall be fitted to all burners. This device shall be of the “complete control” type when the input of the ignition burner exceeds 250 W.

The flame supervision device shall be fitted in such a way that:

- it directly supervises the operation of the burner. However, if this burner is ignited by a permanent or simultaneously functioning pilot, without the use of a flash tube, the device may supervise only the operation of the pilot;
- it is easily accessible and it cannot be relocated incorrectly.

The device shall cut off the gas supply if the sensing element is damaged, or if the connection between the sensing element and the shut-off device is broken, or if the connection between the flame detector and the programming control unit is broken, or if there is a short-circuit.

This device shall act on a safety valve which can be:

- either the valve acted on by the regulating device(s); or
- the valve acted on by the overheat limit device, if any; or
- a valve provided for this purpose.

In all cases, the action of the flame supervision device has priority.

It shall not be possible to override the flame supervision device.

2.2.2.2.2 Flame detectors

The flame detector shall be located to monitor the complete ignition of the main burner.

For burners ignited by a permanent pilot or one operating simultaneously with the main burner, a single flame detector on the pilot is normally adequate where correct cross-lighting is assured. In particular cases, it may be necessary, because of the dimensions of the burner, to place other flame detectors on the main burner, if, due to special operating conditions, rapid cross-lighting is rendered difficult.

2.2.2.3 Gas governor

The fitting of a gas governor is optional for all categories of appliance.

However, a gas governor which is intended to operate under a pressure couple shall be adjusted, or shall be capable of being adjusted so that it cannot operate between the two normal pressures.

2.2.2.4 Regulating and overheat limit devices

The sensing elements of regulating and overheat limit devices shall be placed and protected so as to minimize the risk of damage in normal conditions of use. Regulating devices and overheat limit devices shall not act on the same shut-off component.

In all cases, the action of the overheat limit device has priority.

Safety devices may not act on the same sensing element as the flame supervision device.

Appliance safety shall not be affected by the failure of any part of the detecting system.

Where the control and safety device is of an electronic type with a single sensing element, this device shall operate such that a failure of the safety device results in the shut-down of the appliance.