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Domestic gas cooking appliances — Safety —

Part 22: Particular requirements for ovens and compartment grills

Appareils de cuisson domestiques utilisant les combustibles gazeux — Sécurité —

Partie 22: Exigences particulières pour les fours et compartiments de grillage

Reference number
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Contents

Page

Foreword ..... **vi**
Introduction ..... **vii**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **2**
3.1 Definitions relating to appliances 2
3.2 Definitions relating to components 2
4 Components in gas cooking appliances **2**
4.1 General 2
4.2 Manual gas shut-off valves (Taps) 2
4.3 Knobs 3
4.4 Multifunctional controls 3
4.5 Thermoelectric flame supervision controls 3
4.6 Thermostats 3
4.7 Pressure regulators 3
4.8 Automatic shut-off valves 3
4.9 Injectors and adjusters 3
4.10 Ignition systems 3
4.11 Thermal cut-outs 3
4.12 Cooling fan 3
4.13 Forced convection fan 3
5 General conditions of test **3**
5.1 Reference conditions 3
5.2 Reference and test gases 4
5.3 Test pressures 4
5.4 Temperature conditions 4
5.5 Adjustment of the burner 4
5.6 Test installation 4
5.7 Characteristics of the test pans 4
5.8 Ovens or compartment grills operated in the forced convection mode 4
5.9 Portable ovens and compartment grills 4
6 Heat input **4**
6.1 General 4
6.2 Obtaining the nominal heat input 4
6.2.1 Test of oven and compartment grill with a thermostat 4
6.2.2 Test of oven and compartment grill without a thermostat 5
6.3 Measurements and calculations 5
6.4 Obtaining the reduced heat input 5
6.4.1 Requirement 5
6.4.2 Test 5
6.4.3 Test of oven and compartment grill burner 5
6.5 Total heat input 5
7 Heating **5**
7.1 General 5
7.2 Operating conditions 5
7.3 Heating tests 6
7.3.1 Requirement 6
7.3.2 Test under normal operation 6
7.3.3 Simultaneous operation of oven burner and compartment gas grill burner 7
7.3.4 Temperatures of accidentally touchable surfaces 7
7.4 Abnormal operation 13
7.4.1 General 13

7.4.2 Blocking of the cooling fan ... 13
7.4.3 Failure of the thermostat ... 14
7.4.4 Temperature of components in abnormal forced convection mode ... 14

8 Combustion ... 14
8.1 Measurement of all burners simultaneously ... 14
8.2 Blocked combustion products outlet ... 15
8.3 Analysis of the combustion products ... 15
8.4 Ovens and compartment grills ... 15
8.4.1 General ... 15
8.4.2 Combustion with reference gas ... 15
8.4.3 Combustion with limit gas ... 15
8.4.4 Simultaneous operation of oven and a compartment grill burner ... 15
8.4.5 Combustion with fluctuation of the electrical supply ... 16
8.4.6 Combustion under abnormal operation ... 16
8.5 Forced convection ovens or compartment grills ... 17
8.5.1 General ... 17
8.5.2 Abnormal forced convection mode of forced convection ovens or compartment grills ... 17

9 Ignition, cross-lighting and flame stability ... 17
9.1 General ... 17
9.2 Movement of oven/grill door or cabinet door ... 17
9.3 Oven and compartment grill burner ... 17
9.3.1 General ... 17
9.3.2 Cold conditions ... 18
9.3.3 Hot conditions ... 19
9.4 Forced convection ovens or compartment grills ... 19
9.4.1 General ... 19
9.4.2 Abnormal operation of forced convection ovens or compartment grills ... 19
9.5 Simultaneous operation of the oven burner and a compartment grill burner ... 19
9.5.1 General ... 19
9.5.2 Cold conditions ... 20
9.5.3 Hot conditions ... 21
9.5.4 Movement of oven door or cabinet door during simultaneous operation ... 22
9.6 Ignition test of pyrolytic-self-cleaning oven and compartment grills ... 22
9.6.1 Requirement ... 22
9.6.2 Test ... 22

10 Accumulation of unburnt gas and leak tightness ... 22
10.1 Accumulation of unburnt gas ... 22
10.2 Leakage ... 22
10.3 Leak tightness of the appliance ... 22
10.4 Spillage of un-burnt gas inside the appliance ... 22
10.4.1 Requirement ... 23
10.4.2 Test ... 23
10.4.3 Accumulation of unburnt LPG ... 23

11 Construction ... 23
11.1 General ... 23
11.2 Materials ... 23
11.3 Gas inlet connections ... 23
11.4 Conversion to different gases ... 23
11.5 Pull forces of knobs for manual gas shut-off valves (taps) ... 23
11.6 Appliances that enable the user to program the start or the end of the cooking cycle ... 23
11.7 Compartment for one gas cylinder ... 23
11.8 Touch controls ... 23
11.9 Door lock at high temperature ... 24
11.9.1 Requirement ... 24
11.9.2 Test ... 24

11.10 Appliances having pyrolytic-self-cleaning ovens and compartment grills 24
11.10.1 Door locking means for pyrolytic-self-cleaning oven and compartment grills 24
11.10.2 Temperature limiting means for pyrolytic-self-cleaning ovens and compartment grills 24
11.10.3 Vapour combustion or flash-out during the pyrolytic-self-cleaning cycle 25
11.10.4 Flue gas temperatures of pyrolytic-self-cleaning ovens and compartment grills 25
11.11 Ignition with an external lighter 26

12 Mechanical strength 26
12.1 Parts made of glass and glass-ceramic 26
12.1.1 General 26
12.1.2 Spring hammer test 26
12.1.3 Punch test 27
12.1.4 Appliance door 27
12.2 Appliance body of freestanding appliances 27
12.2.1 Requirement 27
12.2.2 Test 27
12.3 Oven door strength 27
12.3.1 Requirement 27
12.3.2 Test 27
12.4 Tilting of freestanding ovens and compartment grills 28
12.4.1 Tilting 28
12.4.2 Tilting under special conditions 28
12.5 Strength and stability of oven and grill accessories 29
12.5.1 Requirement 29
12.5.2 Test 29
12.6 Portable ovens and compartment grills 29
12.6.1 General 29
12.6.2 Tilting of portable ovens and compartment grills 29

13 Electrical safety 30

14 Marking and instructions 30
14.1 Marking 30
14.1.1 Marking on the appliance 30
14.2 Instructions 30

Annex A (informative) **National deviations in various countries 31**

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 291, *Domestic gas cooking appliances*.

A list of all parts in the ISO 21364 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document provides general requirements for safety of domestic gas cooking appliances.

This document can also be applied, so far as is reasonable, to appliances not mentioned in this specific standard and to appliances designed on the basis of new principles, in which case additional requirements may be necessary.

Where no specific document for an appliance exists, the appliance can be tested according to this document and further tests which take into account the intended use.

Gas burning appliances using fuel gases need to withstand the type of gas which is specified. Other ISO technical committees, e.g. ISO/TC 193, Natural gas, deal with the testing and properties of fuel gases.

Note that, due to the differing properties of fuel gas depending on its source/region of origin, certain differences in regulations exist at present in different regions; some of these differences are presented in Annex A.

This document covers type testing.

This document series is structured as follows:

ISO 21364 Domestic gas cooking appliances – Safety

— Part 1: General requirements

— Part 21: Particular requirements for hobs, surface grills and griddles

— Part 22: Particular requirements for ovens and compartment grills

This document is to be used in conjunction with ISO/TS 21364-1:2021.

This document is designed to be used in combination with ISO 21364-1. Together, they establish the full requirements as they apply to the product covered by this document. Where needed, this document adapts ISO 21364-1 by stating in the corresponding clause:

- “with the following modification”;
- “with the following addition”;
- “is replaced by the following”;

or

- “is not applicable”.

In order to identify specific requirements that are particular to this document, that are not already covered by ISO 21364-1, this document may contain clauses or subclauses that are additional to the structure of ISO 21364-1.

To ensure global relevance of this document, the differing requirements resulting from practical experience and installation practices in various regions of the world have been taken into account. The variations in basic infrastructure associated with appliances have also been recognized, some of which are addressed in ISO/TS 21364-1:2021, Annex E and ISO/TS 21364-22:2021, Annex A. This document intends to provide a basic framework of requirements that recognize these differences.

Domestic gas cooking appliances — Safety —

Part 22:
Particular requirements for ovens and compartment grills

1 Scope

This document specifies particular requirements for safety, construction and materials of domestic gas ovens and compartment grills. For general requirements for safety, construction and materials of gas ovens and compartment grills, ISO/TS 21364-1:2021 applies.

This document covers the following gas cooking appliances:

— ovens with natural or forced convection;

— pyrolytic-self-cleaning ovens and pyrolytic-self-cleaning compartment grills;

— compartment grills

being built-in, table top or part of a cooking range.

— oven accessories

It does not cover gas ovens and compartment grills intended for outdoor use and/or commercial use as well as electrical heated elements as part of the appliance. It does also not cover appliances with automatic burner control systems.

NOTE 1 For requirements of electrical safety refer to the IEC60335 standards series.

NOTE 2 Attention is drawn to the fact that

— for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;

— in many countries additional requirements are specified by the national health authorities, the national water supply authorities and similar authorities.

This document does not cover requirements relating to gas cylinders, their pressure regulators and their connections.

This document does not cover requirements for gas installation.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

ISO/TS 21364-1:2021, *Domestic gas cooking appliances – Safety- Part 1: General requirements*

ISO/TS 21364-21:2021, *Domestic gas cooking appliances – Safety – Part 21: Particular requirements for gas hobs, gas grills and gas griddles*

IEC 60335-2-102:2017, *Household and similar electrical appliances — Safety — Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections*

IEC 60417, *Graphical symbols for use on equipment*

IEC 60584-1:2013, *Thermocouples - Part 1: EMF specifications and tolerances*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

3 Terms and definitions

For the purposes of this document, the terms and definitions of ISO/TS 21364-1:2021 apply with the following additions.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1 Definitions relating to appliances

3.1.1
pyrolytic self-cleaning oven
oven in which cooking deposits are removed by heating the oven to a temperature exceeding 350 °C

[SOURCE: IEC 60335-2-6:2014, 3.105]

3.1.2
cooking surface
horizontal surface of the hob section

3.1.3
forced convection mode
heating mode for appliances equipped with a fan intended to assist the transmission of heat by creating a forced circulation of air or products of combustion

Note 1 to entry: This fan is not intended to supply combustion air.

3.2 Definitions relating to components

3.2.1
evacuation duct
device for transporting combustion products out of the appliance

4 Components in gas cooking appliances

Clause 4 of ISO/TS 21364-1:2021 applies.

4.1 General

ISO/TS 21364-1:2021, 4.1 applies.

4.2 Manual gas shut-off valves (Taps)

ISO/TS 21364-1:2021, 4.2 applies.

4.3 Knobs

ISO/TS 21364-1:2021, 4.3 applies.

4.4 Multifunctional controls

ISO/TS 21364-1:2021, 4.4 applies.

4.5 Thermoelectric flame supervision controls

ISO/TS 21364-1:2021, 4.5 applies.

4.6 Thermostats

ISO/TS 21364-1:2021, 4.6 applies.

4.7 Pressure regulators

ISO/TS 21364-1:2021, 4.7 applies.

4.8 Automatic shut-off valves

ISO/TS 21364-1:2021, 4.8 applies.

4.9 Injectors and adjusters

ISO/TS 21364-1:2021, 4.9 applies.

4.10 Ignition systems

ISO/TS 21364-1:2021, 4.10 applies.

4.11 Thermal cut-outs

ISO/TS 21364-1:2021, 4.11 applies.

4.12 Cooling fan

A motor of a cooling fan shall conform with the requirements of IEC 60335-2-102:2017.

If the appliance has a cooling fan, the fan shall operate automatically.

4.13 Forced convection fan

The motor of a forced convection fan shall conform with the requirements of IEC 60335-2-102:2017.

5 General conditions of test

Clause 5 of ISO/TS 21364-1:2021 applies.

5.1 Reference conditions

ISO/TS 21364-1:2021, 5.1 applies.

5.2 Reference and test gases

ISO/TS 21364-1:2021, 5.2 applies.

5.3 Test pressures

ISO/TS 21364-1:2021, 5.3 applies.

5.4 Temperature conditions

ISO/TS 21364-1:2021, 5.4 applies.

5.5 Adjustment of the burner

ISO/TS 21364-1:2021, 5.5 applies.

5.6 Test installation

ISO/TS 21364-1:2021, 5.6 applies.

5.7 Characteristics of the test pans

ISO/TS 21364-1:2021, 5.7 applies.

5.8 Ovens or compartment grills operated in the forced convection mode

Ovens and compartment grills that can be operated in the forced convection mode are tested in the same way as ovens or grills operated with natural convection but operated in the forced convection mode.

5.9 Portable ovens and compartment grills

Portable ovens and compartment grills are tested according to all the applicable clauses for ovens and compartment grills with the exception of 7.3.2.4, 12.2, 12.3, 12.4 and 12.5.

6 Heat input

Clause 6 of ISO/TS 21364-1:2021 applies.

6.1 General

ISO/TS 21364-1:2021, 6.1 applies.

6.2 Obtaining the nominal heat input

ISO/TS 21364-1:2021, 6.2 applies, with the following additions.

6.2.1 Test of oven and compartment grill with a thermostat

The burner of an appliance with thermostat is tested under the following conditions:

— the burner is ignited and operated with the thermostat at full rate at normal pressure and with the door closed or open to avoid cycling of the thermostat;

— measuring begins from ignition. For analogue meters, measuring terminates when the highest number of complete revolutions have been made before the end of the fifth minute. The test shall be finished before the thermostat starts cycling.

Then the heat input is calculated under reference conditions according to ISO/TS 21364-1:2021, 6.3.

6.2.2 Test of oven and compartment grill without a thermostat

The burner of an appliance without a thermostat is tested under the following conditions:

— with the appliance at ambient temperature, the burner is ignited and operated at full rate at normal pressure for 10 min;

— measurement starts at the end of the tenth minute and finishes at the latest at the end of the thirteenth minute, with a minimum measurement time of one minute or when the highest number of complete revolutions of the meter have been made before the end of the thirteenth minute. For analogue meters, the measurement shall be taken over at least one complete revolution.

Then the heat input is calculated under reference conditions according to ISO/TS 21364-1:2021, 6.3.

6.3 Measurements and calculations

ISO/TS 21364-1:2021, 6.3 applies.

6.4 Obtaining the reduced heat input

ISO/TS 21364-1:2021, 6.4 applies with the following additions.

6.4.1 Requirement

ISO/TS 21364-1:2021, 6.4.1 applies.

6.4.2 Test

ISO/TS 21364-1:2021, 6.4.2 applies.

6.4.3 Test of oven and compartment grill burner

The reduced heat input shall be measured after the nominal heat input at the same conditions with the oven door closed and the gas control is changed to reduced rate. For appliances with thermostatic regulation, the measurement shall be done after 30 minutes, with a minimum measurement time of one minute. If using analogue meters, measurements shall be taken over at least one complete revolution of the analogue meter.

6.5 Total heat input

ISO/TS 21364-1:2021, 6.5 applies.

7 Heating

Clause 7 of ISO/TS 21364-1:2021 applies with the following additions:

7.1 General

ISO/TS 21364-1:2021, 7.1 applies.

7.2 Operating conditions

ISO/TS 21364-1:2021, 7.2 applies.

7.3 Heating tests

ISO/TS 21364-1:2021, 7.3 applies.

7.3.1 Requirement

ISO/TS 21364-1:2021, 7.3.1 applies.

7.3.2 Test under normal operation

ISO/TS 21364-1:2021, 7.3.2 applies.

7.3.2.1 General

ISO/TS 21364-1:2021, 7.3.2.1 applies.

7.3.2.2 Hob burner

ISO/TS 21364-1:2021, 7.3.2.2 applies.

7.3.2.3 Electric hob elements

ISO/TS 21364-1:2021, 7.3.2.3 applies.

7.3.2.4 Oven burner

ISO/TS 21364-1:2021, 7.3.2.4 applies.

7.3.2.5 Electric oven

ISO/TS 21364-1:2021, 7.3.2.5 applies.

7.3.2.6 Gas compartment grill

ISO/TS 21364-1:2021, 7.3.2.6 applies.

7.3.2.7 Electric compartment grill

ISO/TS 21364-1:2021, 7.3.2.7 applies.

7.3.2.8 Gas griddle

ISO/TS 21364-1:2021, 7.3.2.8 applies.

7.3.2.9 Electric griddle

ISO/TS 21364-1:2021, 7.3.2.9 applies.

7.3.2.10 Gas surface grill

ISO/TS 21364-1:2021, 7.3.2.10 applies.

7.3.2.11 Electric surface grill

ISO/TS 21364-1:2021, 7.3.2.11 applies.

7.3.2.12 Gas warming drawer

ISO/TS 21364-1:2021, 7.3.2.12 applies.

7.3.2.13 Electric warming drawer

ISO/TS 21364-1:2021, 7.3.2.13 applies.

7.3.2.14 Ovens or compartment grills operated in the forced convection mode

Ovens and compartment grills that can be operated in the forced convection mode are tested in the same way as ovens or grills with natural convection (see ISO/TS 21364-1:2021, 7.3.2.4 and 7.3.2.6), but with an average temperature of 210 °C instead of 230 °C at the centre of the compartment.

7.3.3 Simultaneous operation of oven burner and compartment gas grill burner

7.3.3.1 Requirement 1

At the end of Test 1 below, the temperature rise of accessible touchable surfaces shall meet the values indicated in 7.3.4.2.1, Table 1.

7.3.3.2 Test 1

The oven burner is operated at an average temperature of 200 °C in the centre of the oven. This temperature is maintained. The grill burner is operated at full rate.

After 1 h of operation the temperatures are measured. For this test the measurement procedure of 7.3.4.2.2 applies.

7.3.3.3 Requirement 2

At the end of Test 2 below, the temperature rise shall meet the values indicated in ISO/TS 21364-1:2021, 7.3.1, Table 4.

7.3.3.4 Test 2

After Test 1 the oven burner and gas grill burner that can be operated simultaneously are supplied with reference gas according to the corresponding Table in ISO/TS 21364-1:2021, Annex A at normal pressure. Hob burners, if any, are not operated.

The oven burner is operated up to an average temperature of 230 °C in the centre of the oven. This temperature is maintained, if this temperature cannot be obtained the control is set to full rate. The grill burner is operated at full rate.

After 1 h of operation or after the burner was shut off by an overheating safety device, if any, the temperatures are measured.

7.3.4 Temperatures of accidentally touchable surfaces

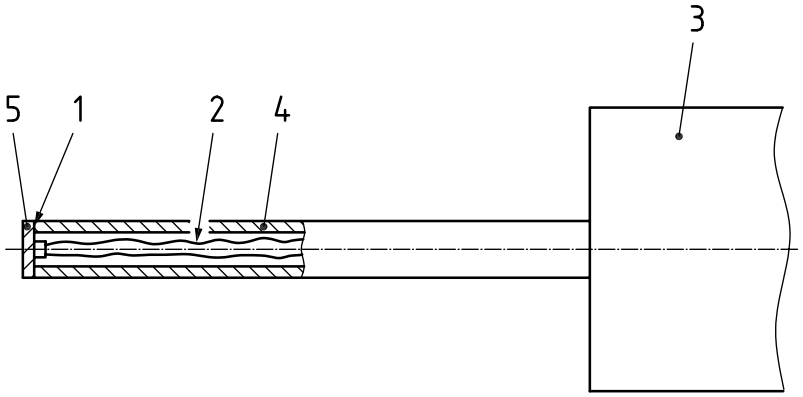
7.3.4.1 General

During the accidentally touchable surfaces temperature tests, if the front and side surfaces are flat, temperature rises are measured using the probe of Figure 1 or any other measuring device giving the same results. For non-flat surfaces fine wire thermocouples are used.

The probe is applied with a force of (4 ± 1) N to the surface in such a way that the best possible contact between the probe and the surface is ensured. The temperature is read after stabilization of the measuring device.

The probe can be held in place using a laboratory stand clamp or similar device.

Dimensions in millimetres



Key

1 adhesive
2 thermocouple wires diameter 0,3 to IEC 60584-1:2013 type K (chrome alumel)
3 handle arrangement permitting contact force of (4 ± 1) N, length (100 ± 2)
4 polycarbonate tube, inside diameter 3, outside diameter 5
5 tinned copper disc diameter 5, 0,5 thick

Figure 1 — Surface temperature probe

7.3.4.2 Temperatures of accidentally touchable surfaces of ovens and compartment grills

7.3.4.2.1 Requirement

During the test below, the temperature rise of accidentally touchable surfaces shall not exceed the values specified in Table 1.

Table 1 — Temperature rise limits for accessible surfaces

Surface	Temperature rise [d] K	
	Front surfaces of oven doors	Other surfaces
Metal and painted metal	45	60
Coated metal[c]	50	65
Glass and ceramic	60	80
Plastic having a thickness exceeding 0,4 mm[b]	80	100[a]

[a] The temperature rise limit of 100 K also applies for plastic material having a metal finish of thickness less than 0,1 mm.

[b] When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of the supporting material apply

[c] Metal is considered coated when a coating having a minimum thickness of 90 µm made by enamel or non-substantially plastic coating is used

d The temperature rise of parts of pyrolytic-self-cleaning ovens, operating under cleaning conditions are 20 K in excess of the temperature rise specified for other surfaces

7.3.4.2.2 Test

Ovens and compartment grills shall be adjusted as specified in ISO/TS 21364-1:2021, 5.5 and installed according to ISO/TS 21364-1:2021, 5.6. Freestanding appliances shall be installed with a rear panel only. The appliance is supplied with each reference gas at normal pressure according to the corresponding Table in ISO/TS 21364-1:2021, Annex A.

All burners that can be operated at the same time in normal use are switched on. Hobs, griddles and surface grills, if any, are operated in accordance with ISO/TS 21364-1:2021, 7.3.2.2, 7.3.2.8 and 7.3.2.10. Warming drawers and similar compartments, if any, are operated with the controls adjusted to the highest setting. All appliances, other than compartment grills, are operated for 60 min.

Ovens are operated without accessories. Only a grid shelf with a thermocouple is positioned on the shelf support closest to the vertical centre of the oven. The temperature in the centre of the oven is maintained at (200 ± 4) °C.

Compartment grill burner are operated for 30 min being operated for the last 30 min of the test. Grill burner having means to reduce the heat input are operated for 15 min with their controls adjusted to the highest setting and then for 15 min at a setting which reduces it to half of the nominal heat input.

Grills provided with a rotating spit are also operated with the spit rotating for 60 min. If the oven has a rotating spit, the duration of the test is 60 min, with the controls set to give the most unfavourable conditions specified in the instructions for use and maintenance. The measurements are only carried out on surfaces for which temperature rise limits for the front surface of oven doors apply.

If the oven has a compartment grill and the instructions for use and maintenance state that for grilling the door should be closed, the test is repeated but with the oven operating in the grilling mode with the controls set according to the instructions for use and maintenance.

If the oven door is protected by a guard, the temperature rise limits in Table 1, specified for the front surface of oven door, apply to the guard. If the guard is a detachable guard, the temperature rise limits in Table 1, specified for other surfaces, apply to parts of the oven door protected by the guard.

Temperature rises are not measured on:

— surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end, unless they are protected by a detachable guard;

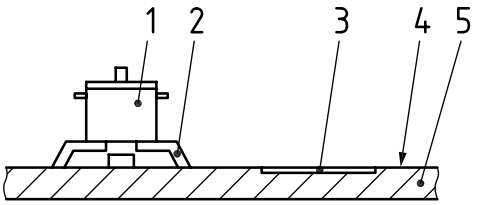
— surfaces that are within 25 mm below the level of the cooking surface of hobs, surface grills and griddles (Figure 2);

— surfaces that are above the level of the cooking surface of hobs, surface grills and griddles (Figure 2). Examples of such surfaces are backguards of the appliance, and vertical top section extensions;

— small parts such as oven vents, hinges and trims where the width of the accessible surface is less than 10 mm;

— surfaces within 10 mm of the edge of the oven door;

— pan supports.



Key

1 pan
2 pan support
3 surface grill or griddle
4 cooking surface
5 worktop

Figure 2 — Cooking surface of hobs, surface grills and griddles

7.3.4.3 Temperatures of accidentally touchable surfaces of forced convection ovens and compartment grills

7.3.4.3.1 Requirement

During the test below, the temperature rise of surfaces shall not exceed the values specified in 7.3.4.2.1, Table 1.

7.3.4.3.2 Test

Ovens and compartment grills that can be operated in the forced convection mode are tested in the same way as ovens or grills with natural convection, but with an average temperature of 180 °C at the centre of the compartment.

7.3.4.4 Temperatures of accidentally touchable surfaces of pyrolytic-self-cleaning ovens and compartment grills

7.3.4.4.1 Requirement

The contact temperatures of the exterior surfaces of an appliance provided with pyrolytic-self-cleaning oven or pyrolytic-self-cleaning grill feature shall not exceed those specified in 7.3.4.2.1, Table 1 and ISO/TS 21364-1:2021, 7.3.1, Table 4 (except the temperatures for knobs and grips) when the appliance is operated in the pyrolytic-self-cleaning mode. If no top surface is provided, this surface is considered to extend 152 mm above the top edge of the compartment door(s).

During the test for pyrolytic-self-cleaning ovens, the temperature rise of the surface of knobs and grips shall not exceed the following values:

— Metal and coated metal 55 K

— Glass and ceramic, porcelain 65 K

— Plastic having a thickness exceeding 0,4 mm, rubber or wood 80 K

The temperature rises of knobs and grips associated with functions that cannot be performed during the cleaning operation are not determined.

7.3.4.4.2 Test

The manufacturer shall specify the temperature and duration of the pyrolytic-self-cleaning mode.

Prior to conducting this test, the appliance shall be adjusted to obtain the pyrolytic-self-cleaning temperature.

This test shall be conducted according to 7.3.4 and ISO/TS 21364-1:2021, 7.3.2 except that the oven(s) temperature shall be the pyrolytic-self-cleaning temperature.

If the appliance includes two compartments, a non-pyrolytic-self-cleaning compartment shall remain inoperative during the test. Two pyrolytic-self-cleaning compartments shall be operated simultaneously, if the controls permit such operation. If the controls do not permit simultaneous operation of the two pyrolytic-self-cleaning compartments, individual tests shall be conducted on each compartment.

The appliance shall be operated through the longest cleaning cycle attainable by using the control system or until all contact temperatures of the exterior surfaces to be measured are constant, whichever results in the shorter operating time. Points of expected maximum contact temperature shall be monitored throughout the duration of the pyrolytic-self-cleaning mode.

7.3.4.5 Temperatures of accidentally touchable surfaces of a portable table-top oven and compartment grill

7.3.4.5.1 Requirement

During the following test, the temperature rise of surfaces shall not exceed the values specified in Table 2.

7.3.4.5.2 Test

The portable table-top oven or compartment grill is placed as specified in ISO/TS 21364-1:2021, 5.6.4 and is supplied with reference gas at normal pressure according to the corresponding Table of ISO/TS 21364-1:2021, Annex A.

The appliance is operated without accessories, with the exception of a grid with the thermocouple for measuring the centre temperature of the compartment.

For an oven with a thermostat, the control is positioned in order to obtain an average temperature of 200 °C at the centre of the compartment.

For an oven without a thermostat, the control is set to the highest position until a temperature of about 200 °C is obtained at the centre of the compartment. The control is then set to the position allowing a temperature of 200 °C to be maintained.

Ovens are operated until steady conditions are established or for 60 min, whichever is shorter.

The grill burner is operated for 30 min. A grill burner with means to reduce the heat input is operated for 15 min with the control adjusted to full rate position and then for 15 min at a setting which reduces it to half of the nominal heat input.

If for a compartment grill the instructions for use and maintenance state that for grilling the door shall be closed, the test is performed with the controls set according to the instructions for use and maintenance.

If the appliance is provided with a rotating spit, it is operated with the spit rotating for 60 min. The controls are set to give the most unfavourable conditions specified in the instructions for use and maintenance. The measurements are only carried out on surfaces for which temperature rise limits for the front surface of the appliance door apply.

Temperature rises are not measured on the following surfaces (see Figure 3):

— surface on the oven door within 10 mm from the edge of the door (Zone 1)

— surfaces around the oven door within 10 mm from the left, right or lower edge of the door, or 25 mm from the upper edge of the door (Zone 2)

— surface within 25 mm of vents (Zone 3)

— underside surfaces and rear surfaces that are not accessible with test probe 41 of IEC 61032:1997, the probe being applied with a force not exceeding 1 N.

Table 2 — Temperature rises for external surfaces of portable table-top appliances

Surface [a]	*Temperature rise of external surfaces* *K* [b]
Metal and painted metal	45
Coated metal [e]	55
Glass and ceramic	60
Plastic and plastic coating exceeding 0,4 mm [c, d]	65

a The following surfaces or elements shall not be taken into consideration:

Knobs or grips including keypads, keyboards or other parts of the equipment that a user needs to touch to operate or adjust the equipment.

Surfaces of heated compartments.

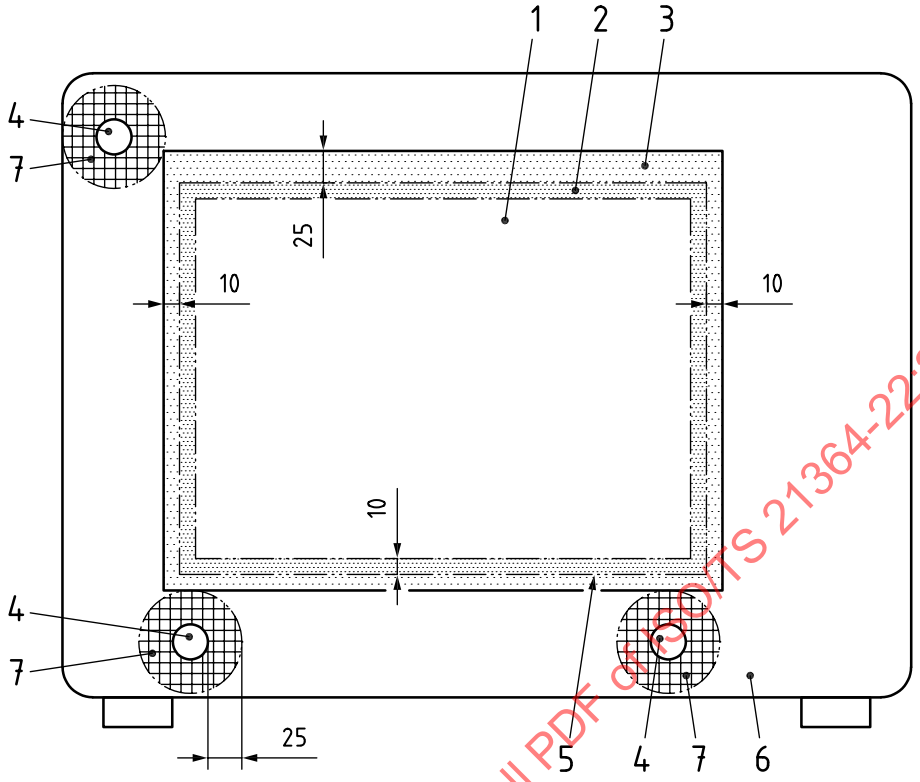
b When the required values are not met, the maximum temperature rise shall not be higher than two times the values indicated and the symbol or the warning of 14.1.1.2 shall be fixed on the appliance.

c The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.

d When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of the supporting material apply.

e Metal is considered coated when a coating having a minimum thickness of 90 µm made by enamel or non-substantially plastic coating is used.

All dimensions in millimetres



Key

1 door
2 excluded area on the door (Zone 1)
3 excluded area around the door (Zone 2)
4 vent
5 door gap
6 oven front surface
7 excluded area around vents (Zone 3)

Figure 3 — Front view of appliance with identification of excluded areas

7.4 Abnormal operation

ISO/TS 21364-1:2021, 7.4 applies, with the following additions.

7.4.1 General

The temperature in the centre of the appliance shall not exceed 425 °C whenever the door can be opened. Glass in doors shall not be damaged.

7.4.2 Blocking of the cooling fan

7.4.2.1 Requirement

During the following test, the temperature rise shall not exceed the values specified in ISO/TS 21364-1:2021, 7.4, Table 5. In addition, the requirement of 8.4.3 shall be verified.

7.4.2.2 Test

The appliance is operated for 1 h or up to steady conditions, whatever is shorter, with one of the reference gases according to the corresponding Table in ISO/TS 21364-1:2021, Annex A at nominal heat input. Then the cooling fan is put out of service. The temperatures are measured after 10 minutes or directly, if the appliance stops its operation when cooling fan is put out of service.

NOTE Steady conditions are deemed to have been achieved when the measured temperatures do not vary by more than 1 K in 15 min.

7.4.3 Failure of the thermostat

7.4.3.1 Requirement

During the following test, the temperature rise shall not exceed the values specified in ISO/TS 21364-1:2021, 7.4, Table 5. In addition, the requirements of 8.4.3 shall be verified.

7.4.3.2 Test

The appliance is operated for 1 h or up to steady conditions, whatever is shorter, with one of the reference gases according to the corresponding Table in ISO/TS 21364-1:2021, Annex A at nominal heat input, and then the thermostat is put out of service. The temperatures are measured after 10 minutes, except for appliances for which the operation is stopped when the thermostat is put out of service.

NOTE Steady conditions are deemed to have been achieved when the measured temperatures do not vary by more than 1 K in 15 min.

7.4.4 Temperature of components in abnormal forced convection mode

7.4.4.1 Requirement

In the following test temperature of safety related components shall not exceed the maximum temperature specified by the component manufacturer.

NOTE Examples of safety related components are:

— taps and cocks;

— gas regulators;

— flame supervision devices;

— thermostats.

7.4.4.2 Test

An appliance having a forced convection oven and/or grill is operated for 1 h or up to steady conditions, whatever is shorter. The test is performed with one of the reference gases according to the corresponding Table in ISO/TS 21364-1:2021, Annex A, at nominal heat input at normal pressure and with the convection fan blocked. The temperatures of the safety related components are measured.

8 Combustion

Clause 8 of ISO/TS 21364-1:2021 applies, with the following additions.

8.1 Measurement of all burners simultaneously

ISO/TS 21364-1:2021, 8.1 applies.

8.2 Blocked combustion products outlet

ISO/TS 21364-1:2021, 8.2 applies.

8.3 Analysis of the combustion products

ISO/TS 21364-1:2021, 8.3 applies.

8.4 Ovens and compartment grills

8.4.1 General

The appliance is tested with reference gas or limit gas according to the corresponding Table in ISO/TS 21364-1:2021, Annex A.

For sampling the products of combustion, a suitable sampling device, such as a tube, shall be used. Care shall be taken to collect a representative sample of the combustion products. The appliance is adjusted according to ISO/TS 21364-1:2021, 5.5 and installed according to ISO/TS 21364-1:2021, 5.6, but without the horizontal wooden panel or range hood above the appliance.

For testing the grill, the compartment door is open or closed according to the instructions for use and maintenance.

8.4.2 Combustion with reference gas

8.4.2.1 Requirement

During the following test the CO concentration in the air free and dry products of combustion, as calculated in ISO/TS 21364-1:2021, 8.3, shall not exceed 0,1 % by volume.

8.4.2.2 Test

The appliance is supplied with each reference gas at maximum pressure and full rate. After 15 min of operation a sample of the combustion products is taken.

8.4.3 Combustion with limit gas

8.4.3.1 Requirement

During the following test the CO concentration in the air free and dry products of combustion, as calculated in ISO/TS 21364-1:2021, 8.3, shall not exceed 0,2 % by volume.

8.4.3.2 Test

The appliance is supplied with the incomplete combustion limit gas at maximum pressure and full rate. After 15 min of operation, a sample of the combustion products is taken.

8.4.4 Simultaneous operation of oven and a compartment grill burner

8.4.4.1 Requirement

During the following test the CO concentration in the air free and dry products of combustion as calculated in ISO/TS 21364-1:2021, 8.3, shall not exceed 0,2 % by volume.

8.4.4.2 Test

Oven and grill burner are operated together at nominal heat input at maximum pressure with incomplete combustion gas. After 15 min of operation, a sample of the combustion products is taken.

8.4.5 Combustion with fluctuation of the electrical supply

8.4.5.1 Requirement

During the following test the CO concentration in the air free and dry products of combustion as calculated in ISO/TS 21364-1:2021, 8.3, shall not exceed 0,2 % by volume.

8.4.5.2 Test

If fluctuations of the main electrical voltage can have an influence on combustion of any burner, the test is carried out individually on each burner with one of the reference gases (see the corresponding Table of ISO/TS 21364-1:2021, Annex A) at normal pressure.

The appliance being supplied with electricity at 1,10 times the maximum nominal voltage specified on the appliance. The test is repeated with the appliance supplied with electricity at 0,85 times the minimum nominal voltage. After 15 min of operation, a sample of the combustion products is taken.

8.4.6 Combustion under abnormal operation

8.4.6.1 Grill burner intended to be operated with the compartment door open

8.4.6.1.1 Requirement

During the following test, the maximum CO concentration of the air-free and dry products of combustion as calculated in ISO/TS 21364-1:2021, 8.3, shall not exceed 0,2 % by volume. This requirement is also met if, 15 min after closure of the door under each of the test conditions, the grill burner gas supply has been shut-off.

8.4.6.1.2 Test

If the grill burner is intended to be operated with the compartment door open it shall be tested with the compartment door closed.

The test is carried out with the appliance supplied with each reference gas at the corresponding normal pressure. The test is carried out with the grill burner operated individually.

The test is carried out first without any oven or grill accessories in place.

For a grill in an oven compartment the test is repeated with the oven or grill accessory supplied with the appliance that has the greatest area opposing the circulation of the products of combustion in place as close as possible to the middle of the oven, any detachable handle having been removed.

For a separate grill compartment the test is repeated with its grill accessory in place but only if it is possible to close the grill compartment door when this accessory, any detachable handle having been removed, is in place under the grill.

With the appliance at ambient temperature, the grill burner is ignited with its control at full rate and then the compartment door is immediately closed.

After 15 min sampling the products of combustion begins. The test is continued for further 45 min, or until the maximum CO concentration of the air-free and dry products of combustion is achieved, whichever the shorter.

If the grill burner flames have been extinguished before sampling begins open the compartment door and re-ignite the burner and operate it for 10 min with its control at full rate. The compartment door is then closed and after 15 min sampling of the products of combustion starts. The test is continued for further 45 min, or until the maximum CO concentration of the air-free and dry products of combustion is achieved, whichever the shorter.

For a grill burner with a low rate position, the test is repeated with the grill burner control adjusted to low rate position.

In the case of a fixed rate grill burner, repeat the test at minimum supply pressure.

Where the appliance has a factory-fitted means that does not rely on user for its operation to physically prevent closure of the grill door whilst the grill burner is in operation, the test is performed with the door closed to the position allowed by this device.

8.5 Forced convection ovens or compartment grills

8.5.1 General

Ovens and compartment grills that can be operated in the forced convection mode shall fulfil the tests of 8.4 also in this mode.

8.5.2 Abnormal forced convection mode of forced convection ovens or compartment grills

Ovens and compartment grills that can be operated in the forced convection mode only, shall fulfil the tests of 8.4 with the forced convection fan not working.

9 Ignition, cross-lighting and flame stability

Clause 9 of ISO/TS 21364-1:2021 applies, with the following additions.

9.1 General

ISO/TS 21364-1:2021, 9.1 applies.

9.2 Movement of oven/grill door or cabinet door

ISO/TS 21364-1:2021, 9.2 applies.

9.3 Oven and compartment grill burner

9.3.1 General

Ovens and compartment grills are tested with reference gas or limit gas according to the corresponding Table in ISO/TS 21364-1:2021, Annex A without accessories.

Compartment grills are tested with the door open and/or closed as specified in the instructions for use and maintenance.

9.3.2 Cold conditions

9.3.2.1 Ignition

9.3.2.1.1 Requirement

During the following test correct ignition is checked. After ignition, a smooth cross lighting shall occur within 6 s. A slight tendency to flame lift is permitted but flames shall be stable within 60 s after ignition. The test shall be repeated five times. At least four ignition attempts shall be successful.

9.3.2.1.2 Test

The test is started from cold conditions (see ISO/TS 21364-1:2021, 5.4). Each of the burners is supplied with each reference gas at normal pressure and ignited at full rate or at the ignition position defined by the manufacturer, if any.

9.3.2.2 Light back

9.3.2.2.1 Requirement

During the following test sequence there shall be

— no extinction or light back by turning the control from full rate to low rate. Full extinction of the burner is allowed provided that the flame supervision device cuts the gas flow to the burner;

— a stable flame when turning the control from low rate to full rate.

The test sequence shall be repeated five times. All tests shall be successful.

9.3.2.2.2 Test

The test is started from cold conditions (see ISO/TS 21364-1:2021, 5.4). Each of the burners is supplied with each reference gas at normal pressure and ignited at full rate or at the ignition position defined by the manufacturer, if any.

The control is turned from full rate to low rate in a time of approximately 1 s. No extinction or light back shall occur. Full extinction of the burner shall be allowed provided the flame supervision device cuts the gas flow. After 4s the control is turned back to full rate. There shall be a stable flame. Then the burner is turned off.

9.3.2.3 Flame lift

9.3.2.3.1 Requirement

During the following test correct ignition is checked. After ignition, a smooth cross lighting shall occur within 6 s. A slight tendency to flame lift is permitted but flames shall be stable within 60 s after ignition. The test shall be repeated five times. At least four ignition attempts shall be successful.

9.3.2.3.2 Test

The test is started from cold conditions (see ISO/TS 21364-1:2021, 5.4). Each of the burners is supplied with flame lift limit gas at maximum pressure and ignited at full rate or at the ignition position defined by the manufacturer, if any.

9.3.3 Hot conditions

9.3.3.1 Light back

9.3.3.1.1 Requirement

During the following test sequence there shall be

— no extinction or light back by turning the control from full rate to low rate. Complete extinction of the burner is allowed provided that the flame supervision device cuts the gas flow to the burner;

— no light back, when the burner is ignited immediately after it was turned off.

The test sequence shall be repeated five times. All tests shall be successful.

9.3.3.1.2 Test

The burner is supplied with light back limit gas at minimum pressure. The burner is ignited and operated until hot conditions (see ISO/TS 21364-1:2021, 5.4) are reached.

The control is turned from full rate to low rate in a time of approximately 1 s. No extinction or light back shall occur. Complete extinction is allowed when the gas supply to the burner is shut off by the flame supervision device.

The control is then turned to off position. The burner is ignited again immediately after complete extinction of the flame at full rate or at the ignition position defined by the manufacturer, if any. No light back shall occur. The control is then turned to off position.

9.4 Forced convection ovens or compartment grills

9.4.1 General

Ovens and compartment grills that can be operated in the forced convection mode shall fulfil the requirements of 9.3.

9.4.2 Abnormal operation of forced convection ovens or compartment grills

Ovens and compartment grills that can be operated in the forced convection mode only, shall fulfil the requirements of 9.3 with the forced convection fan not working.

9.5 Simultaneous operation of the oven burner and a compartment grill burner

9.5.1 General

The appliance is supplied with each reference gas according to the corresponding Table in ISO/TS 21364-1:2021, Annex A and installed according to ISO/TS 21364-1:2021, 5.6 and tested without accessories.

Hot and cold ignition tests with AC supplied systems are performed at a reduced voltage of 0,85 times the lowest nominal voltage. Battery ignition systems are tested at nominal voltage.

9.5.2 Cold conditions

9.5.2.1 Ignition

9.5.2.1.1 Requirement

During the following test correct ignition is checked. After ignition, a smooth cross lighting shall occur within 6 s. A slight tendency to flame lift is permitted but flames shall be stable within 60 s after ignition. The test shall be repeated three times. At least two ignition attempts shall be successful.

9.5.2.1.2 Test

The test is started from cold conditions (see ISO/TS 21364-1:2021 1, 5.4). Each of the burners is supplied with each reference gas at normal pressure and ignited. Both burners have to be ignited in full rate position or low rate, if no ignition position is marked. Both burners shall be ignited simultaneously, if possible by design.

9.5.2.2 Light back

9.5.2.2.1 Requirement

During the following three test sequences there shall be

— no extinction or light back by turning the control(s) from full rate to low rate. Full extinction of the burner is allowed provided that the flame supervision device cuts the gas flow to the burner;

— a stable flame after turning back to full rate.

Each test sequence shall be repeated five times. All tests shall be successful.

9.5.2.2.2 Tests

The tests are started from cold conditions (see ISO/TS 21364-1:2021, 5.4). Each of the burners is supplied with each reference gas at normal pressure and ignited.

9.5.2.2.2.1 Test 1

The controls of both the oven burner and the grill burner are turned from full rate to low rate in a time of approximately 1 s. No extinction or light back shall occur. Full extinction of the burner shall be allowed provided the flame supervision device cuts the gas flow. After 4 s the controls are turned back to full rate. There shall be stable flames. Then the burners are turned off.

9.5.2.2.2.2 Test 2

The oven control is turned to full rate. The control of the grill burner is turned from full rate to low rate in a time of approximately 1 s. No extinction or light back shall occur. Full extinction of the burner shall be allowed provided the flame supervision device cuts the gas flow. After 4 s the control is turned back to full rate. There shall be stable flames. Then the burners are turned off.

9.5.2.2.2.3 Test 3

The grill control is turned to full rate. The control of the oven burner is turned from full rate to low rate in a time of approximately 1 s. No extinction or light back shall occur. Full extinction of the burner shall be allowed provided the flame supervision device cuts the gas flow. After 4 s the control is turned back to full rate. There shall be stable flames. Then the burners are turned off.

9.5.2.3 Flame lift

9.5.2.3.1 Requirement

During the following test, correct ignition is checked. After ignition, a smooth cross lighting shall occur within 6 s. A slight tendency to flame lift is permitted but flames shall be stable within 60 s after ignition.

Each test shall be repeated three times. At least two ignition attempts shall be successful.

9.5.2.3.2 Test

Each test is started from cold conditions (see ISO/TS 21364-1:2021, 5.4). Each of the burners is supplied with flame lift limit gas at maximum pressure.

The following tests are carried out:

a. Oven burner and grill burner at full rate;

b. Oven burner at low rate and grill burner at full rate;

c. Oven burner at full rate and grill burner at low rate;

d. Oven burner and grill burner at low rate;

9.5.3 Hot conditions

9.5.3.1 Light back

9.5.3.1.1 Requirement

During the following three test sequences there shall be

— no extinction or light back by turning the control(s) from full rate to low rate. Full extinction of the burner is allowed provided that the flame supervision device cuts the gas flow to the burner;

— no light back, when the burner is ignited immediately after it was turned off.

Each test sequence shall be repeated five times. All tests shall be successful.

9.5.3.1.2 Tests

The burners are supplied with light back limit gas at minimum pressure. The burners are ignited and operated until hot conditions (see ISO/TS 21364-1:2021, 5.4) are reached.

9.5.3.1.2.1 Test 1

The controls of both the oven burner and the grill burner are turned from full rate to low rate in a time of approximately 1 s. No extinction or light back shall occur. Full extinction of the burner shall be allowed provided the flame supervision device cuts the gas flow. Then the controls are turned to the off position. The burners are ignited immediately again. No light back shall occur. The controls are then turned to the off position.

9.5.3.1.2.2 Test 2

The oven control is turned to full rate. The control of the grill burner is turned from full rate to low rate in a time of approximately 1 s. No extinction or light back shall occur. Full extinction of the burner shall be allowed provided the flame supervision device cuts the gas flow. Then the controls are turned to the

off position. The burners are ignited immediately again. No light back shall occur. The controls are then turned to the off position.

9.5.3.1.2.3 Test 3

The grill control is turned to full rate. The control of the oven burner is turned from full rate to low rate in a time of approximately 1 s. No extinction or light back shall occur. Full extinction of the burner shall be allowed provided the flame supervision device cuts the gas flow. Then the controls are turned to the off position. The burners are ignited immediately again. No light back shall occur. The controls are then turned to the off position.

9.5.4 Movement of oven door or cabinet door during simultaneous operation

The clause of ISO/TS 21364-1:2021, 9.2 is repeated with both burners in operation.

9.6 Ignition test of pyrolytic-self-cleaning oven and compartment grills

9.6.1 Requirement

During the following test the ignition of the surface cooking part of appliance provided with a pyrolytic-self-cleaning oven or pyrolytic-self-cleaning grill features shall not be adversely affected by operation at pyrolytic-self-cleaning temperature.

9.6.2 Test

The test specified in ISO/TS 21364-21:2021, 9.3.2.2 shall be conducted after the oven or grill has reached the manufacturer's specified pyrolytic-self-cleaning temperature.

Prior to conducting these tests, the appliance shall be adjusted so the manufacturer's specified pyrolytic-self-cleaning temperature will be obtained.

In the event the appliance is designed so that any burner or combination of burners is not capable of being used during the cleaning cycle, this burner(s) shall not be subject to these tests.

These tests shall be conducted prior to the conduct of any cleaning tests and repeated after the conduct of all pyrolytic-self-cleaning tests.

10 Accumulation of unburnt gas and leak tightness

Clause 10 of ISO/TS 21364-1:2021 applies.

10.1 Accumulation of unburnt gas

ISO/TS 21364-1:2021, 10.1 applies.

10.2 Leakage

ISO/TS 21364-1:2021, 10.2 applies.

10.3 Leak tightness of the appliance

ISO/TS 21364-1:2021, 10.3 applies.

10.4 Spillage of un-burnt gas inside the appliance

ISO/TS 21364-1:2021, 10.4 applies with the following additions.

10.4.1 Requirement

ISO/TS 21364-1:2021, 10.4.1 applies.

10.4.2 Test

ISO/TS 21364-1:2021, 10.4.2 applies.

10.4.3 Accumulation of unburnt LPG

For appliances capable of using third family gases (LPG), the space situated under the oven or grill burners shall be designed so that in the case of release of unburnt gas, this gas can escape out of the appliance without risk of accumulation.

11 Construction

Clause 11 of ISO/TS 21364-1:2021 applies with the following additions.

11.1 General

ISO/TS 21364-1:2021, 11.1 applies.

11.2 Materials

ISO/TS 21364-1:2021, 11.2 applies.

11.3 Gas inlet connections

ISO/TS 21364-1:2021, 11.3 applies.

11.4 Conversion to different gases

ISO/TS 21364-1:2021, 11.4 applies.

11.5 Pull forces of knobs for manual gas shut-off valves (taps)

ISO/TS 21364-1:2021, 11.5 applies.

11.6 Appliances that enable the user to program the start or the end of the cooking cycle

ISO/TS 21364-1:2021, 11.6 applies.

11.7 Compartment for one gas cylinder

ISO/TS 21364-1:2021, 11.7 applies.

11.8 Touch controls

ISO/TS 21364-1:2021, 11.8 applies.

11.9 Door lock at high temperature

11.9.1 Requirement

Ovens that reach a temperature above 350 °C in full rate position shall be equipped with a door lock that prohibits access to the inside of the compartment as long as this temperature is attained. This requirement is checked during the following test.

11.9.2 Test

Temperature readings shall be obtained using thermocouples as required by ISO/TS 21364-1:2021, 5.6.1. The thermocouple is in the centre of the oven.

The burner is ignited and operated at full rate at normal pressure. When the temperature reaches 350 ºC check manually that the door is locked.

11.10 Appliances having pyrolytic-self-cleaning ovens and compartment grills

11.10.1 Door locking means for pyrolytic-self-cleaning oven and compartment grills

Doors providing access to pyrolytic-self-cleaning ovens or pyrolytic-self-cleaning grills, or to other compartments involved in the pyrolytic-self-cleaning mode, shall have means that will lock the doors at pyrolytic-self-cleaning cycle temperatures in excess of 350 °C.

The locking means shall be interlocked with the pyrolytic-self-cleaning cycling operation. The locking means shall not interfere with normal oven and grill cooking operations.

Components of door lock mechanisms that are temperature actuated shall withstand 100000 cycles of thermal operation without mechanical or electrical failure. The calibration temperature of the device, after continued operation, shall not vary more than ± 10 % of the calibration temperature before the continued operation test.

Components of door lock mechanisms that are manually or electrically actuated prior to placing the appliance in a pyrolytic-self-cleaning cycle shall withstand 3000 cycles of operation without mechanical or electrical failure.

11.10.2 Temperature limiting means for pyrolytic-self-cleaning ovens and compartment grills

11.10.2.1 General

A pyrolytic-self-cleaning oven or pyrolytic-self-cleaning grill shall be provided with means to limit the oven or grill compartment temperature to the manufacturer's specified cleaning temperature. This may be accomplished either by the operating thermostat or by a separate control.

11.10.2.2 Requirement

During the test below the limiting means shall operate to control the temperature at or below the manufacturer's specified cleaning temperature.

11.10.2.3 Test

The cleaning cycle shall be started and, after the compartment has attained a steady condition temperature, the input rate shall be increased by an increase in manifold pressure or other convenient means.

Temperature readings shall be obtained using thermocouples as required by ISO/TS 21364-1:2021, 5.6.1.

11.10.3 Vapour combustion or flash-out during the pyrolytic-self-cleaning cycle

11.10.3.1 Requirement

Any burning of combustible vapours during the pyrolytic-self-cleaning mode shall be contained within the oven or grill compartment or flue-way and be safely vented and shall not cause damage to the appliance under the conditions of test specified below.

There shall be no burning of combustible vapours outside the appliance or any visible damage to the appliance.

11.10.3.2 Test

A grid of five parallel-connected thermocouples shall be located in the oven. Oven temperature shall be specified as measured, using thermocouples as required by ISO/TS 21364-1:2021, 5.6.1.

Prior to conducting this test, the appliance shall be adjusted to the manufacturer's specified cleaning temperature that will be obtained.

Spark electrodes shall be located within the oven or separate grill compartment in the following approximate locations: one so it is centred in the compartment (40 ± 2) mm above the bottom rack when the rack is in the lowest position, one (100 ± 2) mm above the compartment bottom in the area where the flue gases enter the compartment, one centred in the compartment, and one (25 ± 2) mm in front of the centre of the flue outlet. These spark electrodes shall be wired in series and connected to a suitable spark transformer.

An additional spark electrode shall be located at the flue outlet.

These tests shall be conducted with reference gas according to the corresponding Table in ISO/TS 21364-1:2021, Annex A at normal pressure and nominal heat input.

A 0,07 kg test load, consisting of a mixture of 2/3 beef gravy and 1/3 hydrogenated vegetable oil by weight, shall be applied to all interior pyrolytic-self-cleaning compartment surfaces (excluding burners, radiants, and racks).

The appliance shall be placed in operation and the load baked on at a temperature of (290 ± 2) °C for 1,5 h. This procedure shall be repeated two additional times, cooling between loadings. After a total of 0,21 kg are baked onto the compartment surfaces and the appliance is cooled to room temperature, the cleaning cycle shall be started.

The spark electrodes at the vent outlet and inside the compartment shall be energized at 5 °C increments of compartment temperature until the temperatures reach steady conditions and at 2 min intervals during the remaining portion of the cleaning cycle.

11.10.4 Flue gas temperatures of pyrolytic-self-cleaning ovens and compartment grills

11.10.4.1 Requirement 1

In the following test the flue temperatures of a pyrolytic-self-cleaning oven or pyrolytic-self-cleaning grill designed to be connected to an external venting system shall not exceed (266 ± 1) K above room temperature when the oven or grill is operating during the cleaning cycle.

11.10.4.2 Test 1

A (1,2 ± 0,05) m length of vertical vent pipe of the proper size to accommodate the flue outlet shall be attached to the flue outlet. The flue gas temperature shall be measured by a temperature indicating or recording device and nine thermocouples placed in a plane perpendicular to the axis of the flue outlet in the vent pipe at a point of (150 ± 2) mm above the outlet from the draft hood. One of the thermocouple