

INTERNATIONAL STANDARD

**Household and similar electrical appliances – Safety –
Part 2-119: Particular requirements for commercial vacuum packaging
appliances**

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INTERNATIONAL STANDARD

Household and similar electrical appliances – Safety –
Part 2-119: Particular requirements for commercial vacuum packaging
appliances

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-119: Particular requirements for commercial vacuum packaging appliances

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60335-2-119 edition 1.1 contains the first edition (2021-08) [documents 61/6176/CDV and 61/6295/RVC] and its amendment 1 (2025-01) [documents 61/7236/CDV and 61/7348/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

IEC 60335-2-119 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 60335 series, published under the general title *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This Part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

NOTE 1 When “Part 1” is mentioned in this standard, it refers to IEC 60335-1.

This Part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for commercial vacuum packaging appliances.

When a particular subclause of Part 1 is not mentioned in this Part 2, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website:

<https://www.iec.ch/tc61/supportingdocuments>

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another Part 2 of IEC 60335, the relevant Part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a Part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the Part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal publications, basic safety publications and group safety publications covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

- IEC standards published by TC 59 concerning methods of measuring performance;
- CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-119: Particular requirements for commercial vacuum packaging appliances

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of commercial electric packaging appliances using vacuum conditions for food preservation, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances including direct current (DC) supplied appliances.

These appliances are not intended for household and similar purposes. They are used for commercial preservation of food in areas not open to the public, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries and butcheries.

Examples of appliances that are within the scope of this standard are:

- chamber vacuum packaging appliances;
- vacuum packaging appliances.

These appliances may be provided with a film-sealing function.

This standard also deals with the hygiene aspects of appliances.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by users. However, in general, it does not consider young children playing with the appliance.

Attention is drawn to the fact that:

- for appliances intended to be used in vehicles or onboard ships or aircraft, additional requirements may be necessary;
- in many countries, additional requirements for appliances incorporating pressure vessels are specified;
- in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

This standard does not apply to:

- appliances which operate with injection in the vacuum chamber of inert gas with an oxygen content exceeding 21 %;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
- vacuum packaging appliances for household and similar use (IEC 60335-2-45);

~~– battery-operated appliances.~~

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60068-2-52:2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

ISO 683-1:2016, *Heat-treatable steels, alloy steels and free-cutting steels – Part 1: Non-alloy steels for quenching and tempering*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 ~~Replacement~~ *Modification:*

Replace the first paragraph with the following:

operation of the appliance under the following conditions:

Vacuum packaging appliances and **chamber vacuum packaging appliances** without deaeration function are operated empty in vacuum and sealing cycles in accordance with the instructions, choosing the most unfavourable condition. If no instructions are given, the appliance is operated for the:

- vacuum function, the maximum period allowed by the construction;
- sealing function, 10 s or the maximum period allowed by a timer, if higher, with a rest period of 30 s between each cycle.

The sealing function is carried out by sealing together two sheets of plastic film. The plastic film is high pressure (low density) polyethylene, each sheet having a thickness of 50 µm.

Vacuum packaging appliances and **chamber vacuum packaging appliances** provided with deaeration function intended to remove air molecules from liquids, creams and sauces are operated as indicated above but for 5 min for the vacuum function.

Vacuum packaging appliances and **chamber vacuum packaging appliances** for vacuum and sealing and which can perform sealing function only, are also operated for a series of operating cycles as specified in the instruction for use, choosing the most unfavourable condition. If no instructions are given, in each cycle the sealing function is operated 10 s.

In all cases the sealing operation period is followed by a further period of 15 s for the appliance to be ready to perform the next sealing operation.

The sealing function is carried out by sealing together two sheets of plastic film. The plastic film is high pressure (low density) polyethylene, each sheet having a thickness of 50 µm.

3.5 Definitions relating to types of appliances

3.5.101

vacuum packaging appliance

appliance in which the vacuum function is performed with the packaging outside the vacuum chamber

Note 1 to entry: **Vacuum packaging appliances** may be provided with a sealing function.

3.5.102

chamber vacuum packaging appliance

appliance in which the vacuum function is performed with the packaging inside a vacuum chamber

Note 1 to entry: **Chamber vacuum packaging appliances** may be provided with a sealing function and/or gas injection function that avoids crushing of the food.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Modification:*

Appliances shall be **class I**, **class II** or **class III**.

6.2 *Addition:*

Appliances normally used on a table shall be at least IPX3. Other appliances shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Addition*

Appliances which may operate with gas injection in the vacuum chamber, shall be marked with:

- the substance of the following:
WARNING: The oxygen content in the gas shall not exceed 21 %
- the maximum pressure allowed at the injection gas inlet.

7.12 *Modification:*

The instruction concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge and children playing with the appliance is not applicable.

7.12.101 For **chamber vacuum packaging appliances**, the instructions shall include the substance of the following:

WARNING: Risk of implosion – If the surface of the lid is cracked or damaged, do not use the appliance and refer to the after sales service for its replacement.

WARNING: Risk of injury – If unintended disconnection of the appliance from the power supply during the vacuum process leads to blocking the opening mechanism of the vacuum chamber, do not force the lid to open it and operate as indicated in the instructions for use.

Instructions for appliances designed to use rigid vacuum containers such as pots and jars shall draw the attention of the user to the need to verify the maximum vacuum pressure to which vacuum containers can be subjected without distortion or breakage in case such containers are not supplied with the appliance or indicated in the instructions for use.

The instructions of appliances provided with a sealing function shall draw the attention of the user on the fact that some residual heating is present on the sealing bars at the end of the vacuum process.

For appliances which may operate with gas injection, the instruction shall:

- indicate the name of the gases allowed for injection or at least limit them to inert gases;
- indicate a suitable method for the calculation of the gas concentration in the workroom based on the type of gas used, considering as worst-case scenario the one when the gas inlet valve in the appliance is permanently open. Information on how to calculate the gas concentration is given in informative Annex AA;
- draw the attention of the user on the need to close the gas supply each time the appliance is not in use;
- draw the attention of the user on the need to verify the concentration of gas in the workroom and to take adequate precautions (e.g. to provide suitable room ventilation), in case the calculated amount of gas concentration reaches dangerous levels;
- the instructions shall state the substance of the following warnings:
 - **WARNING:** To avoid risk of high flammability or explosion – The oxygen percentage in the gas shall be maximum 21 %.
 - **WARNING:** To avoid risk of suffocation – If injection gas is used, an appropriate air exchange rate shall be ensured in the workroom;
- if a pressure reducer is not incorporated in the appliance, the instructions shall indicate that a suitable pressure reducer shall be applied at the customer's site to ensure that the maximum applied pressure corresponds to the one marked on the appliance.

8 Protection against access to live parts

This clause of Part 1 is applicable.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable except as follows.

11.7 Replacement:

~~The appliance is operated under normal operation until steady conditions are established.~~

~~Appliance outlets accessible to the user and socket outlets accessible to the user are loaded with a resistive load that gives the marked outlet load.~~

Modification:

Replace the first paragraph with the following:

The appliance is operated under normal operation until steady conditions are established.

12 Charging of metal-ion batteries

This clause of Part 1 is ~~not~~ applicable.

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.1 Addition:

In addition, appliances, except those marked IPX5 and IPX6, are subjected for 5 min to the following splash test.

The apparatus shown in Figure 101 is used. The appliance is placed in normal position of use and adjustable feet shall be set at minimum level in accordance with the instruction for use.

For appliances normally used on the floor, the bowl is placed on the floor and is moved around in such a way as to splash the sides of the appliance from all directions. During the test, the water pressure is so regulated that the water splashes up 150 mm above the bottom of the bowl.

For all other appliances, the bowl is placed on the same plane where the appliance is placed and is moved around in such a way as to splash the sides of the appliance from all directions. During the test, the water pressure is so regulated that the water splashes up 100 mm above the bottom of the bowl. The appliance shall not be hit by the direct jet.

15.2 Addition:

Compliance is also checked by the tests of 15.2.101 and 15.2.102.

15.2.101 *For all appliances, 0,5 l of the spillage solution is poured rapidly over the top of the appliance in the most unfavourable way so that the spillage solution also flows over the surfaces of the appliance that incorporate controls and other places where it may penetrate the appliance enclosure, the controls being placed in the most unfavourable position. The controls are then operated through their working range, this operation being repeated after 5 min.*

*For **chamber vacuum packing appliances**, the test is carried out with the lid placed in the fully open or fully closed position, whichever is likely to be the most unfavourable.*

For appliances having a working surface, the test is repeated with the appliance tilted at an angle of 2° in relation to the position of normal use in the direction which is likely to be the most unfavourable.

The lid of top loading appliances is considered as a working surface if it is flat enough to put something on.

Additional action, like drying of tested areas, may be needed to ensure that first pouring test does not impact the result of the second one.

*The appliance shall withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

15.2.102 *Parts liable to be cleaned are wiped in turn, with a sponge, having dimensions approximately 150 mm × 75 mm × 50 mm, saturated with water containing approximately 1 % NaCl. The sponge is applied without appreciable force for approximately 10 s to each surface.*

After each cleaning test, all residues are removed, and the appliance is dried to ensure that a cleaning test is not impacted by a preceding one.

*The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on the insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

15.101 *Packaging appliances shall be constructed so that suction of liquid does not impair electrical insulation. This requirement does not apply to parts operating at **safety extra-low voltage**.*

Compliance is checked by the following tests.

*For **vacuum packaging appliances**, one plastic channelled bag with dimensions 20 cm × 30 cm filled with water containing approximately 1 % NaCl, at a temperature of 30 °C ± 0,5 °C, is positioned so that the surface of the water is at the same level as the suction opening of the appliance. Then the vacuum and sealing process is performed.*

NOTE Channelled vacuum bags are vacuum bags specifically designed to allow air to escape easily from the bag.

*For **chamber vacuum packaging appliances**, a quantity of water at a temperature of 30 °C ± 0,5 °C containing approximately 1 % NaCl and equal to 10 % of the volume of the vacuum chamber is poured in the chamber. Then the vacuum and sealing process is performed.*

*The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on the insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 Addition:

Appliances are also subjected to the tests of 19.101, 19.102 and 19.103.

19.101 *The appliance is supplied at **rated voltage** and operated under **normal operation**. The vacuum pump is operated until a **non-self-resetting thermal cut-out** operates or until steady conditions are established.*

19.102 *The oil anti back-flow device is rendered inactive and the appliance is operated under the conditions specified in Clause 11.*

After the test, the appliance is checked by inspection and no traces of oil shall be detected on any part of the vacuum chamber and its lid.

19.103 *The vacuum pump is operated continuously for 5 min, with the appliance supplied at **rated voltage**.*

No traces of oil shall be detected on the pump outlets or on any component of the appliance.

20 Stability and mechanical hazards

This clause of Part 1 is applicable.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.101 The top surface of **chamber vacuum packaging appliances** shall withstand the stresses liable to occur in normal use.

Compliance is checked by the following test.

The appliance is operated as in normal use at maximum vacuum setting according to the instructions, with gas injection, if any, not operating and for one cycle of operation.

The vacuum pressure is monitored; when it reaches its maximum value during the vacuum cycle, a weight of 5 kg as shown in Figure 102 is dropped from a height of 1 m on the geometrical centre of the cover of the appliance. The weight is made from C40 steel as specified in ISO 683-1:2016.

To ensure a correct impact point, the weight shall be guided, taking care that the guide does not influence the impact energy.

During the test, either the cover shall not break or, if it breaks, no particles shall be ejected to a distance of more than 10 cm around any part of the appliance.

22 Construction

This clause of Part 1 is applicable except as follows.

22.101 For **chamber vacuum packaging appliances**, hinged lids shall be protected against accidental closing.

Compliance is checked by the following test.

The appliance is placed in any normal position of use on a plane inclined at an angle of 10° to the horizontal in the most unfavourable position and with the lid open.

The lid shall not close.

22.102 If appliances incorporate food areas or splash areas, the surfaces of such areas shall be cleanable so that all unwanted matter can be removed. If necessary, food areas shall be capable of being disinfected.

The food area comprises surfaces in contact with the food and surfaces that the food may contact during preparation of the product. The splash area comprises surfaces on which part of the food may splash or flow during normal use, but this food does not become part of the product.

Compliance is checked by inspection after having operated the appliance as in normal use and then cleaning and disinfecting it in accordance with the instructions for use.

22.103 If appliances incorporate food areas, non-food areas that are not adequately separated from food areas shall be constructed so that the retention of moisture or unwanted matter, and the ingress of vermin, is prevented.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.2 Addition:

The microenvironment is pollution degree 3 and the insulation shall have a comparative tracking index (CTI) not less than 250, unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance due to:

- condensation produced by the appliance;
- the use of liquids and solids, such as ingredients, products, or cleaning agents.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2.3 Not applicable.

31 Resistance to rusting

This clause of Part 1 is applicable except as follows.

Addition:

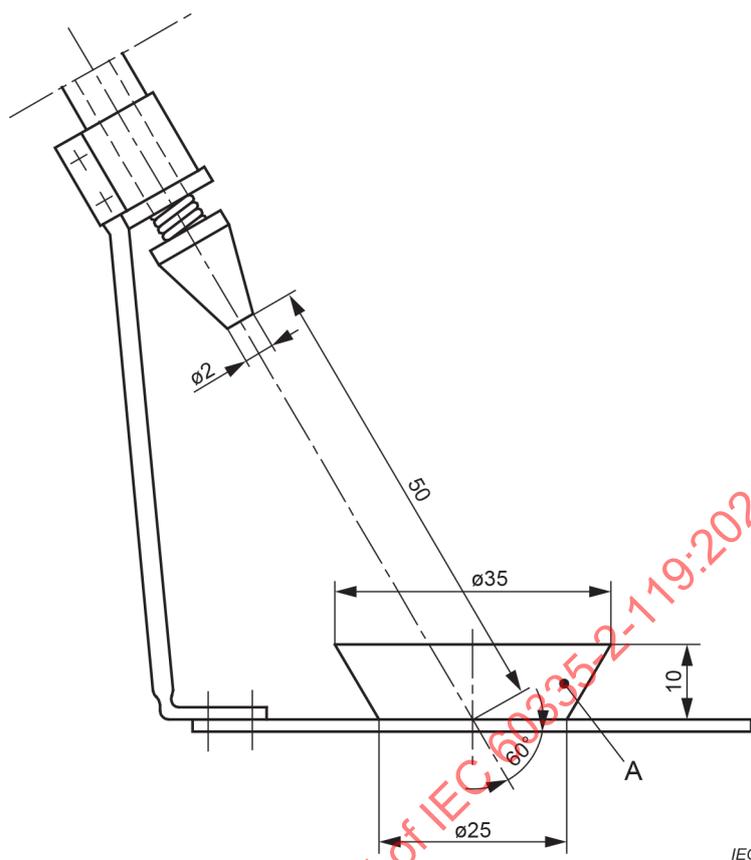
For surfaces of food areas and splash areas compliance is checked by the salt mist test Kb of IEC 60068-2-52:2017, Test method 1.

After the test, the appliance shall not have deteriorated to such an extent that compliance with this standard, in particular with Clauses 8 and 27, is impaired. No visible traces of rusting shall be detected.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Dimensions in millimetres



Key

A Bowl

Figure 101 – Splash apparatus

Dimensions in millimetres

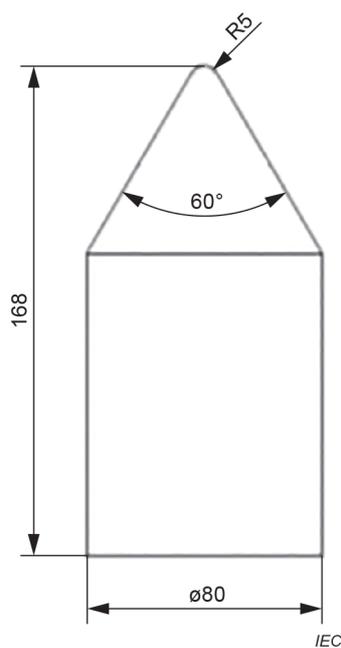


Figure 102 – Weight for mechanical test

Annexes

The annexes of Part 1 are applicable except as follows.

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Annex AA (informative)

Method for calculating the gas concentration

AA.1 Calculation of gas concentration

The following information shall be considered by the manufacturer. If the manufacturer does not clearly specify and limit the size of the working space and the gas cylinder, the following information shall be given in the instructions.

AA.2 Calculations for safe operation with protective gases (modified atmosphere packaging)

AA.2.1 Guidance for the evaluation of ventilation requirements

The ventilation requirements depend on numerous factors such as location, type of gas and possible leaks. Ventilation can be natural or forced ventilation. The normal index to be considered is the number of air exchanges per hour.

Typically, the required number of air exchanges can be calculated based on an estimated gas outlet or leakage rate of a machine in operation. A homogeneous gas distribution is assumed, and the following formula is applied:

$$C_t = \frac{L \times (1 - e^{-nt})}{V_r \times n}$$

where

C_t is the gas concentration at time t ;

L is the gas flow [m³/h];

V_r is the volume of the room [m³];

n are the air exchanges per hour;

t is the time of gas flow in hours.

For long periods of time (t with a tendency towards infinity), the following applies:

$$C_\infty = \frac{L}{V_r \times n}$$

Since this calculation refers to continuous gas discharge, the goal shall be to keep the oxygen concentration between 20 % and 22 % by sufficient ventilation (air exchanges).

Natural air ventilation rates can be evaluated as follows:

- In above-ground locations without special ventilation openings, natural ventilation generally achieves one air exchange per hour. However, this does not apply to buildings in which the windows are gas tight.
- If special ventilation openings are available, up to two air changes per hour can be assumed.
- For underground rooms with small windows, an average natural air exchange rate of 0,4 per hour can be assumed.

- For more than 2 air exchanges per hour a forced ventilation system is required.

Special building regulations may recommend or require a specific number of air exchanges per hour for different conditions, i.e. 5, 10, 20.

In case of doubt on required air exchanges, contact an appropriately licensed ventilation technician or refer to building regulations concerning the specific installation.

AA.2.2 Calculation for the use of gas cylinders in rooms

This requirement deals with the worst-case scenario, where the entire contents of a gas cylinder or storage container leak into the room immediately as a result of a catastrophic failure, such as a burst hose, a leaking pipe connection or a permanently open gas valve. The trigger for such an event could be the failure of a regulator.

In the event of such a catastrophic scenario, mastering the situation is initially more important than trying to restore an atmosphere suitable as a working environment. For this reason, an oxygen concentration of 25 % is acceptable in the short term.

The calculation can also be performed for oxygen replacing gases. In this case, it is essential that the oxygen concentration shall not fall below 18 %.

The remaining oxygen concentration in the room can be calculated as follows:

$$C_{\text{ox}} = \frac{100 \times V_{\text{O}}}{V_{\text{r}}}$$

where

C_{ox} is the remaining oxygen concentration [%];

V_{O} is the volume of oxygen in the room [m³];

V_{r} is the volume of the room [m³] subtracting the volume of all large objects.

For gas cylinders with gases replacing oxygen the following applies:

$$V_{\text{O}} = 0,21 \times (V_{\text{r}} - V_{\text{tg}}) \text{ m}^3 \text{ of O}_2$$

where

V_{tg} is the gas volume in the full gas cylinder at 15 °C and 101,3 kPa.

For gas cylinders with oxygen, the following applies:

$$V_{\text{O}} = 0,21 \times (V_{\text{r}} - V_{\text{tg}}) + V_{\text{OG}} \text{ m}^3 \text{ of O}_2$$

where

V_{OG} is the oxygen volume in the full gas cylinder at 15 °C and 101,3 kPa.

For pure oxygen, $V_{\text{OG}} = V_{\text{tg}}$

For a mixture of x % O₂ in inert gas, the following applies:

$$V_{OG} = \frac{x}{100} \times V_{tg}$$

If, according to calculations, the contents of an oxygen cylinder leaking into the room would result in an oxygen concentration of over 25 %, there are four possibilities:

- a) place the gas cylinder and the packaging machine in a larger room to ensure an oxygen concentration lower than 25 %,
- b) use a smaller gas cylinder with a volume adequate to ensure that the oxygen concentration results lower than 25 %,
- c) safely prevent the gas escaping from the machine by appropriate means and move the gas supply outside,
- d) monitor the gas concentration in the room by measurement and automatically cut off the gas supply via a safe solenoid valve on the gas cylinder if the oxygen concentration exceeds 22 %.

As a general rule from these calculations, the volume of oxygen stored in a gas cylinder shall not exceed one twentieth (5 %) of the free volume of the room. The corresponding acceptable short-term concentration of nitrogen gases is 18 %, which is about one seventh (14 %) of the free volume of the room.

It shall be ensured that only one gas cylinder can be emptied at a time. However, if gas cylinders are coupled so that both gas cylinders would empty in the event of a failure, the volume from both gas cylinders shall be included in the calculation.

Example 1:

Calculation of the O₂ concentration resulting from the discharge from a full oxygen cylinder with a capacity of 8 m³ into a room with a volume of 300 m³:

$$\begin{aligned}
 V_r &= \text{Volume of the room} &= & 300 \text{ m}^3 \\
 V_{tg} &= V_{OG} = \text{Leakage from the gas cylinder} &= & 8 \text{ m}^3 \\
 V_O &= \text{volume of oxygen to be calculated} \\
 V_O &= 0,21 \times (V_r - V_{tg}) + V_{OG} \\
 &= 0,21 \times (300 - 8) + 8 &= & 69,3 \text{ m}^3 \\
 C_{ox} &= \frac{100 \times V_{OG}}{V_r} \\
 &= \frac{100 \times 69,3}{300} &= & 23,1 \%
 \end{aligned}$$

This is a satisfactory case.

Example 2:

Calculation of the oxygen concentration resulting from the leakage from a full mixed gas cylinder with a capacity of 9,8 m³, the contents of which consist of 20 % CO₂ and 80 % O₂, into a room with a volume of 120 m³:

The gas outlet V_{tg} from the gas bottle is 9,8 m³ and thus 9,8 m³ of air is replaced from the room, but only $0,8 \times 9,8 = 7,8 \text{ m}^3$ of new oxygen flows into the room.

This oxygen volume is named V_{OG} .

V_O in this mixed gas example is $0,21 \times (V_r - V_{tg}) + V_{OG}$

$$V_O = 0,21 \times (120 - 9,8) + 7,8 = 31 \text{ m}^3$$

$$C_{Ox} = \frac{100 \times 31}{120} = 25,8 \%$$

This is an unsafe case.

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Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-45, *Household and similar electrical appliances – Safety – Part 2-45: Particular requirements for portable heating tools and similar appliances*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-119: Particular requirements for commercial vacuum packaging appliances

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60335-2-119 edition 1.1 contains the first edition (2021-08) [documents 61/6176/CDV and 61/6295/RVC] and its amendment 1 (2025-01) [documents 61/7236/CDV and 61/7348/RVC].

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

IEC 60335-2-119 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 60335 series, published under the general title *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This Part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

NOTE 1 When “Part 1” is mentioned in this standard, it refers to IEC 60335-1.

This Part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for commercial vacuum packaging appliances.

When a particular subclause of Part 1 is not mentioned in this Part 2, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website:

<https://www.iec.ch/tc61/supportingdocuments>

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another Part 2 of IEC 60335, the relevant Part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a Part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the Part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal publications, basic safety publications and group safety publications covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

- IEC standards published by TC 59 concerning methods of measuring performance;
- CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-119: Particular requirements for commercial vacuum packaging appliances

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of commercial electric packaging appliances using vacuum conditions for food preservation, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances including direct current (DC) supplied appliances.

These appliances are not intended for household and similar purposes. They are used for commercial preservation of food in areas not open to the public, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries and butcheries.

Examples of appliances that are within the scope of this standard are:

- chamber vacuum packaging appliances;
- vacuum packaging appliances.

These appliances may be provided with a film-sealing function.

This standard also deals with the hygiene aspects of appliances.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by users. However, in general, it does not consider young children playing with the appliance.

Attention is drawn to the fact that:

- for appliances intended to be used in vehicles or onboard ships or aircraft, additional requirements may be necessary;
- in many countries, additional requirements for appliances incorporating pressure vessels are specified;
- in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

This standard does not apply to:

- appliances which operate with injection in the vacuum chamber of inert gas with an oxygen content exceeding 21 %;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
- vacuum packaging appliances for household and similar use (IEC 60335-2-45).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60068-2-52:2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

ISO 683-1:2016, *Heat-treatable steels, alloy steels and free-cutting steels – Part 1: Non-alloy steels for quenching and tempering*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 *Modification:*

Replace the first paragraph with the following:

operation of the appliance under the following conditions:

Vacuum packaging appliances and **chamber vacuum packaging appliances** without deaeration function are operated empty in vacuum and sealing cycles in accordance with the instructions, choosing the most unfavourable condition. If no instructions are given, the appliance is operated for the:

- vacuum function, the maximum period allowed by the construction;
- sealing function, 10 s or the maximum period allowed by a timer, if higher, with a rest period of 30 s between each cycle.

The sealing function is carried out by sealing together two sheets of plastic film. The plastic film is high pressure (low density) polyethylene, each sheet having a thickness of 50 µm.

Vacuum packaging appliances and **chamber vacuum packaging appliances** provided with deaeration function intended to remove air molecules from liquids, creams and sauces are operated as indicated above but for 5 min for the vacuum function.

Vacuum packaging appliances and **chamber vacuum packaging appliances** for vacuum and sealing and which can perform sealing function only, are also operated for a series of operating cycles as specified in the instruction for use, choosing the most unfavourable condition. If no instructions are given, in each cycle the sealing function is operated 10 s.

In all cases the sealing operation period is followed by a further period of 15 s for the appliance to be ready to perform the next sealing operation.

The sealing function is carried out by sealing together two sheets of plastic film. The plastic film is high pressure (low density) polyethylene, each sheet having a thickness of 50 µm.

3.5 Definitions relating to types of appliances

3.5.101

vacuum packaging appliance

appliance in which the vacuum function is performed with the packaging outside the vacuum chamber

Note 1 to entry: **Vacuum packaging appliances** may be provided with a sealing function.

3.5.102

chamber vacuum packaging appliance

appliance in which the vacuum function is performed with the packaging inside a vacuum chamber

Note 1 to entry: **Chamber vacuum packaging appliances** may be provided with a sealing function and/or gas injection function that avoids crushing of the food.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Modification:

Appliances shall be **class I**, **class II** or **class III**.

6.2 Addition:

Appliances normally used on a table shall be at least IPX3. Other appliances shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition

Appliances which may operate with gas injection in the vacuum chamber, shall be marked with:

- the substance of the following:
WARNING: The oxygen content in the gas shall not exceed 21 %
- the maximum pressure allowed at the injection gas inlet.

7.12 Modification:

The instruction concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge and children playing with the appliance is not applicable.

7.12.101 For **chamber vacuum packaging appliances**, the instructions shall include the substance of the following:

WARNING: Risk of implosion – If the surface of the lid is cracked or damaged, do not use the appliance and refer to the after sales service for its replacement.

WARNING: Risk of injury – If unintended disconnection of the appliance from the power supply during the vacuum process leads to blocking the opening mechanism of the vacuum chamber, do not force the lid to open it and operate as indicated in the instructions for use.

Instructions for appliances designed to use rigid vacuum containers such as pots and jars shall draw the attention of the user to the need to verify the maximum vacuum pressure to which vacuum containers can be subjected without distortion or breakage in case such containers are not supplied with the appliance or indicated in the instructions for use.

The instructions of appliances provided with a sealing function shall draw the attention of the user on the fact that some residual heating is present on the sealing bars at the end of the vacuum process.

For appliances which may operate with gas injection, the instruction shall:

- indicate the name of the gases allowed for injection or at least limit them to inert gases;
- indicate a suitable method for the calculation of the gas concentration in the workroom based on the type of gas used, considering as worst-case scenario the one when the gas inlet valve in the appliance is permanently open. Information on how to calculate the gas concentration is given in informative Annex AA;
- draw the attention of the user on the need to close the gas supply each time the appliance is not in use;
- draw the attention of the user on the need to verify the concentration of gas in the workroom and to take adequate precautions (e.g. to provide suitable room ventilation), in case the calculated amount of gas concentration reaches dangerous levels;
- the instructions shall state the substance of the following warnings:
 - **WARNING:** To avoid risk of high flammability or explosion – The oxygen percentage in the gas shall be maximum 21 %.
 - **WARNING:** To avoid risk of suffocation – If injection gas is used, an appropriate air exchange rate shall be ensured in the workroom;
- if a pressure reducer is not incorporated in the appliance, the instructions shall indicate that a suitable pressure reducer shall be applied at the customer's site to ensure that the maximum applied pressure corresponds to the one marked on the appliance.

8 Protection against access to live parts

This clause of Part 1 is applicable.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable except as follows.

11.7 Modification:

Replace the first paragraph with the following:

The appliance is operated under normal operation until steady conditions are established.

12 Charging of metal-ion batteries

This clause of Part 1 is applicable.

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.1 Addition:

In addition, appliances, except those marked IPX5 and IPX6, are subjected for 5 min to the following splash test.

The apparatus shown in Figure 101 is used. The appliance is placed in normal position of use and adjustable feet shall be set at minimum level in accordance with the instruction for use.

For appliances normally used on the floor, the bowl is placed on the floor and is moved around in such a way as to splash the sides of the appliance from all directions. During the test, the water pressure is so regulated that the water splashes up 150 mm above the bottom of the bowl.

For all other appliances, the bowl is placed on the same plane where the appliance is placed and is moved around in such a way as to splash the sides of the appliance from all directions. During the test, the water pressure is so regulated that the water splashes up 100 mm above the bottom of the bowl. The appliance shall not be hit by the direct jet.

15.2 Addition:

Compliance is also checked by the tests of 15.2.101 and 15.2.102.

15.2.101 *For all appliances, 0,5 l of the spillage solution is poured rapidly over the top of the appliance in the most unfavourable way so that the spillage solution also flows over the surfaces of the appliance that incorporate controls and other places where it may penetrate the appliance enclosure, the controls being placed in the most unfavourable position. The controls are then operated through their working range, this operation being repeated after 5 min.*

For chamber vacuum packing appliances, the test is carried out with the lid placed in the fully open or fully closed position, whichever is likely to be the most unfavourable.

For appliances having a working surface, the test is repeated with the appliance tilted at an angle of 2° in relation to the position of normal use in the direction which is likely to be the most unfavourable.

The lid of top loading appliances is considered as a working surface if it is flat enough to put something on.

Additional action, like drying of tested areas, may be needed to ensure that first pouring test does not impact the result of the second one.

*The appliance shall withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

15.2.102 *Parts liable to be cleaned are wiped in turn, with a sponge, having dimensions approximately 150 mm × 75 mm × 50 mm, saturated with water containing approximately 1 % NaCl. The sponge is applied without appreciable force for approximately 10 s to each surface.*

After each cleaning test, all residues are removed, and the appliance is dried to ensure that a cleaning test is not impacted by a preceding one.

*The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on the insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

15.101 Packaging appliances shall be constructed so that suction of liquid does not impair electrical insulation. This requirement does not apply to parts operating at **safety extra-low voltage**.

Compliance is checked by the following tests.

*For **vacuum packaging appliances**, one plastic channelled bag with dimensions 20 cm × 30 cm filled with water containing approximately 1 % NaCl, at a temperature of 30 °C ± 0,5 °C, is positioned so that the surface of the water is at the same level as the suction opening of the appliance. Then the vacuum and sealing process is performed.*

NOTE Channelled vacuum bags are vacuum bags specifically designed to allow air to escape easily from the bag.

*For **chamber vacuum packaging appliances**, a quantity of water at a temperature of 30 °C ± 0,5 °C containing approximately 1 % NaCl and equal to 10 % of the volume of the vacuum chamber is poured in the chamber. Then the vacuum and sealing process is performed.*

*The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on the insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 Addition:

Appliances are also subjected to the tests of 19.101, 19.102 and 19.103.

19.101 *The appliance is supplied at **rated voltage** and operated under **normal operation**. The vacuum pump is operated until a **non-self-resetting thermal cut-out** operates or until steady conditions are established.*

19.102 *The oil anti back-flow device is rendered inactive and the appliance is operated under the conditions specified in Clause 11.*

After the test, the appliance is checked by inspection and no traces of oil shall be detected on any part of the vacuum chamber and its lid.

19.103 *The vacuum pump is operated continuously for 5 min, with the appliance supplied at **rated voltage**.*

No traces of oil shall be detected on the pump outlets or on any component of the appliance.

20 Stability and mechanical hazards

This clause of Part 1 is applicable.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.101 The top surface of **chamber vacuum packaging appliances** shall withstand the stresses liable to occur in normal use.

Compliance is checked by the following test.

The appliance is operated as in normal use at maximum vacuum setting according to the instructions, with gas injection, if any, not operating and for one cycle of operation.

The vacuum pressure is monitored; when it reaches its maximum value during the vacuum cycle, a weight of 5 kg as shown in Figure 102 is dropped from a height of 1 m on the geometrical centre of the cover of the appliance. The weight is made from C40 steel as specified in ISO 683-1:2016.

To ensure a correct impact point, the weight shall be guided, taking care that the guide does not influence the impact energy.

During the test, either the cover shall not break or, if it breaks, no particles shall be ejected to a distance of more than 10 cm around any part of the appliance.

22 Construction

This clause of Part 1 is applicable except as follows.

22.101 For **chamber vacuum packaging appliances**, hinged lids shall be protected against accidental closing.

Compliance is checked by the following test.

The appliance is placed in any normal position of use on a plane inclined at an angle of 10° to the horizontal in the most unfavourable position and with the lid open.

The lid shall not close.

22.102 If appliances incorporate food areas or splash areas, the surfaces of such areas shall be cleanable so that all unwanted matter can be removed. If necessary, food areas shall be capable of being disinfected.

The food area comprises surfaces in contact with the food and surfaces that the food may contact during preparation of the product. The splash area comprises surfaces on which part of the food may splash or flow during normal use, but this food does not become part of the product.

Compliance is checked by inspection after having operated the appliance as in normal use and then cleaning and disinfecting it in accordance with the instructions for use.

22.103 If appliances incorporate food areas, non-food areas that are not adequately separated from food areas shall be constructed so that the retention of moisture or unwanted matter, and the ingress of vermin, is prevented.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.2 Addition:

The microenvironment is pollution degree 3 and the insulation shall have a comparative tracking index (CTI) not less than 250, unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance due to:

- condensation produced by the appliance;
- the use of liquids and solids, such as ingredients, products, or cleaning agents.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2.3 Not applicable.

31 Resistance to rusting

This clause of Part 1 is applicable except as follows.

Addition:

For surfaces of food areas and splash areas compliance is checked by the salt mist test Kb of IEC 60068-2-52:2017, Test method 1.

After the test, the appliance shall not have deteriorated to such an extent that compliance with this standard, in particular with Clauses 8 and 27, is impaired. No visible traces of rusting shall be detected.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.