

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



AMENDMENT 1  
AMENDEMENT 1

**Electrical household and similar cooling and freezing appliances – Food preservation**

**Appareils électrodomestiques et appareils de refroidissement et de réfrigération analogues – Conservation des aliments**

[IEC 63169:2020/AMD1:2024](https://standards.iteh.ai/standards/iec/063878a9-0d57-4747-a6de-e1c59e4771e9/iec-63169-2020-amd1-2024)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL HOUSEHOLD AND SIMILAR COOLING  
AND FREEZING APPLIANCES – FOOD PRESERVATION –**

**AMENDMENT 1**

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Amendment 1 to IEC 63169:2020 has been prepared by IEC technical subcommittee 59M: Performance of electrical household and similar cooling and freezing appliances, of IEC technical committee 59: Performance of household and similar electrical appliances.

The text of this Amendment is based on the following documents:

Draft	Report on voting
59M/174/FDIS	59M/176/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Amendment 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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications/](http://www.iec.ch/publications/).

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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.

## 1 Scope

*Replace the existing Scope with the following:*

This document deals with two food preservation tests. A **weight loss** test and a **condensation** test.

The **weight loss** test simulates the **weight loss** of leafy produce, given certain conditions of temperature, humidity and air movement in one or more test zones. The aim of the test is to measure the **weight loss rate** by measuring the weight of a **test tray** prior to the test and again after a given duration.

The **condensation** test simulates **condensation** produced by real food on surfaces of the **test zone**, given certain conditions of temperature, humidity and air movement in one or more **test zones**. This test assesses the **condensation** in refrigerator **test zones** by using **test trays** filled with non-woven fabric to generate **condensation**, and then evaluates the **condensation** extent and distribution.

The **weight loss** test and **condensation** test apply to **test zones** that have an average operating temperature greater than 0 °C.

Both the **weight loss** test and **condensation** test are performed in series and not in parallel on the same refrigerator.

Both the **weight loss** test and the **condensation** test can only be applied to **test zones** having all dimensions exceeding 200 mm × 150 mm × 100 mm (L × W × H).

## 2 Normative references

Replace IEC 62552-1:2015, *Household refrigerating appliances – Characteristics and test methods – Part 1: General requirements*

with the following:

IEC 62552-1:2015, *Household refrigerating appliances – Characteristics and test methods – Part 1: General requirements*  
IEC 62552-1:2015/AMD1:2020

## 3 Terms and definitions

### 3.1

#### test zone

Replace the existing definition with the following:

space inside the refrigeration appliance subject to the **weight loss** test and the **condensation** test

Add the following Notes to entry:

Note 3 to entry: These tests cannot be performed in a compartment that is a non-enclosed space.

Note 4 to entry: The height of the **test zone** is the lid. If there is no lid, the height is the next horizontal surface immediately above the **test zone**.

Add, after 3.5, the following new definitions:

### 3.6

#### removable accessory

accessory that is movable, removable, or adjustable by the customer if instructed to do so in the user instructions to enable a different refrigerator function or configuration to be used

Note 1 to entry: Cleaning is not regarded as a different function so instructions to remove parts for cleaning-only, do not meet this requirement.

Note 2 to entry: Tools can be required for removal of such parts if so instructed.

### 3.7

#### condensation

droplets of water that appear on the cold surfaces of a **test zone**

### 3.8

#### total condensation

sum of all the **condensation** calculated in 6.5.4

### 3.9

#### average condensation

**total condensation** divided by the number of grid rectangles calculated in 6.2

## 4 Test preparation

Table 1 – Test equipment

Replace the existing Table 1 with the following:

**Table 1 – Test equipment**

<b>Test tray</b>	For 3D printing files (stp and stl files) for both the 18-sheet <b>test tray</b> for the <b>weight loss</b> test and the 6-sheet <b>test tray</b> for the <b>condensation</b> test – see normative Annex B. The <b>weight loss</b> test uses a single large tray The <b>condensation</b> test uses a number of small trays as calculated in 6.2  The <b>test tray</b> shall be non-absorbent and watertight. This can be achieved by coating the <b>test tray</b> after the printing process.
<b>Test sheet</b>	<b>Test sheets</b> shall be cut from a filter material (typically material used for radiator evaporators). The size of a sheet is 75 mm × 125 mm.  A material is specified in informative Annex A. For a method of proving equivalence of alternate materials, refer to informative Annex D.

Add, after 4.3, the following new subclause 4.4:

### 4.4 Test tray water

The temperature of the water in the **test tray(s)** for the **weight loss** test and **condensation** test shall be within  $\pm 2$  K of the temperature of the **test zone** to be evaluated. Each **test tray** shall be preconditioned for 24 h to ensure it is within  $\pm 2$  K of the temperature of the **test zone** to be evaluated. Preconditioning can be in the **test zone** or in another refrigerator.

## 5 Weight loss test

### 5.1 Procedure

<https://standards.globalspec.com/stds/iec63169/2020/amd1/2024> Replace the two paragraphs immediately after Figure 1 with the following: [e9/iec-63169-2020-amd1-2024](https://standards.globalspec.com/stds/iec63169/2020/amd1/2024)

If the **test tray** cannot be placed due to the presence of a **removeable accessory**, the accessory can be moved/removed/adjusted in accordance with the manufacturer's **user instructions**.

If the **test tray** still cannot be placed, then a valid **weight loss** test cannot be performed.

Add, after 5.2, the following new Clause 6:

## 6 Condensation test

### 6.1 General

The **condensation** test consists of evaluating the **condensation** in a **test zone**. This is done by dividing all 6 **test zone** surfaces into rectangles. Multiple small **test trays** are loaded with water and non-woven fabric. The compartment/refrigerator door is closed. After 72 h, evaluation is made by assessing the **condensation** in each rectangle and summing them accordingly. Clarification of some **test zone** surfaces is contained in informative Annex H.

## 6.2 Preparation of test zone

Remove any **condensation** from the **test zone** prior to placing the **test tray** by wiping with a tissue or paper towel.

The test material consists of a number of small **test trays** with 6 sheets of non-woven fabric material as specified in Table A.1.

The number of small **test trays** is the volume of the **test zone** (in litres)/3 rounded to the nearest integer value.

For example, a 25,3 l crisper should load  $25,3/3 = 8,43$  to be rounded to 8 small **test trays**, and a 25,6 l crisper should load  $25,6/3 = 8,53$  to be rounded to 9 small **test trays**.

Each surface of the **test zone** is divided into a grid of rectangles according to the following method.

- determine each length or height of the **test zone** in mm and divide by 50;
- round the length or height up to the next whole number and this gives the number of rectangles for that dimension.

See informative Annex G for examples. This means that there will likely be a different number of rectangles horizontally and vertically. The maximum dimension of a rectangle will be 50 mm.

Part rectangles (for example a sloping side) are counted as a complete rectangle.

NOTE For practical purposes, examples of usable rectangles could be a grid marked on the **test zone** before testing, or a transparency held against the surface during evaluation.

For the **condensation** test multiple **test zones** may be tested simultaneously. Any **test zones** in the refrigerator that are not being tested do not need to have **test trays** loaded.

## 6.3 Test tray placement

To allow a trial **test tray** placement, the **test trays** are left empty and loaded into the **test zone**.

The **test trays** are clipped together using the clips of normative Annex B. If all the **test trays** can be placed on the base of the **test zone** then they are centralised both left to right and front to back.

If the shape of the **test zone** prohibits centralising the **test trays** as above, the **test trays** are biased to the front and/or left to right and place them on the base.

If necessary, the **test trays** can be disconnected from the clips to allow some **test trays** to move forward or backward relative to one another (or left or right) but the **test trays** spacing shall be at least 5 mm side to side. These 5 mm do not include any spacers which are formed as part of the **test tray**.

The **test trays** can be at angles to each other (preferably a right angle).

If necessary, an upper layer of **test trays** can be stacked on top of the lower layer. As many **test trays** as possible shall be in the lower layer before any additional **test trays** are stacked.

At all times there shall be at least 10 mm vertical clearance between the top of any **test sheet** and the underside of the **test zone** lid.



If, because of the size and/or shape of the **test zone**, the required number of **test trays** cannot be loaded, then the **test trays** spacing can be reduced. For the test to remain valid, the following minimums shall be observed. There shall be at least

- 1 mm spacing between **test trays**;
- 3 mm spacing between the **test trays** and **test zone** walls.

Any upper layer **test trays** should be centralised over the lower layer biasing to the front and left if necessary.

If the base of the **test zone** is angled, then the **test trays** can sit on the angled base if the inclination is less than 15 mm high for each 100 mm length of the base. Inclinations greater than this shall have the **test trays** supported horizontally by a packer. In all cases, the 10 mm vertical clearance of any **test sheet** and the **test zone** lid shall be observed.

A record (photos or drawings, etc.) of the **test trays** layout should be in the test report described in informative Annex C.

Before starting the test, the quality of the non-woven materials can be inspected as detailed in informative Annex A.

If **test trays** cannot be placed due to the presence of an accessory, the accessory can be moved/removed/adjusted in accordance with the manufacturer's **test zone** description. If no specific instructions are provided, in the case of a:

- **removeable accessory** at the required position, the accessory shall be moved, removed or adjusted if possible;
- non-removable accessory, **test trays** may be stacked in 2 layers.

If **test trays** still cannot be placed, then a valid **condensation** test cannot be performed.

**Test trays** can be filled with dry or wet **test sheets**. If dry **test sheets** are used then the **test tray** should be charged with 200 g ± 50 g of distilled water. Less water can be used if wet **test sheets** are used.

NOTE Historical weight data of the **test tray** and **test sheets** can expedite the addition of an appropriate quantity of water.

If the **test sheets** cannot face perpendicular to the refrigerator front door, the **test trays** shall be placed with **test sheets** facing parallel to the door.

See informative Annex F for examples of alternative **test tray** layouts.

#### 6.4 Test procedure

- 1) Prepare the **test zone** as specified in 6.2.
- 2) Load and place the **test trays** as specified in 6.3.
- 3) Close the **test zone** and/or refrigerator door.
- 4) Record the start time.
- 5) Leave the refrigerator door closed during the test.
- 6) During the test, the water shall not freeze.
- 7) After 72 h, begin the **condensation** evaluation.

## 6.5 Condensation evaluation

### 6.5.1 General

**Condensation** evaluation is made by visual assessment of the **condensation** on each surface of the **test zone**. The degree of **condensation** depends on:

- the position of **condensation** on the surface of **test zone**;
- the severity of **condensation**.

NOTE Guidance on how to carry out the evaluation is given in informative Annex H.

### 6.5.2 Position and severity of condensation

#### 6.5.2.1 Position of condensation on the surface of test zone

Each rectangle as specified in 6.2 is used when assessing **condensation** on each **test zone** surface.

#### 6.5.2.2 Severity of condensation

Each rectangle is assessed for severity with only the maximum severity being recorded for the final calculation. Then assess the number of rectangles for each level of **condensation**. Any **condensation** in a rectangle means that rectangle is counted in the final calculation, regardless of the area of **condensation** within the rectangle.

Each rectangle is allocated a **condensation** severity score (CSS) as specified in Table 2.

**Table 2 – Condensation severity score**

Condensation type	CSS
Mist/No <b>condensation</b>	0
Drops with any dimension < 10 mm	1
Running water	1
Pooling with any dimension > 10 mm	3
NOTE Pooling is only on the <b>test zone</b> base and is the result of running water	

### 6.5.3 Condensation

The **condensation** on each rectangle is assessed according to 6.5.2.2. **Condensation** (C) on each surface is the sum of all of the rectangles on that surface with any **condensation**, multiplied by each rectangle's **condensation** severity score. Each surface of the **test zone** is calculated separately and then added for the total.

### 6.5.4 Total condensation (TC)

$$TC = C_{\text{Front}} + C_{\text{Back}} + C_{\text{Top}} + C_{\text{Bottom}} + C_{\text{LH Side}} + C_{\text{RH Side}}$$

### 6.5.5 Average condensation ( $C_{\text{Avg}}$ )

$$C_{\text{Avg}} = TC / (\text{Total number of rectangles on all surfaces})$$

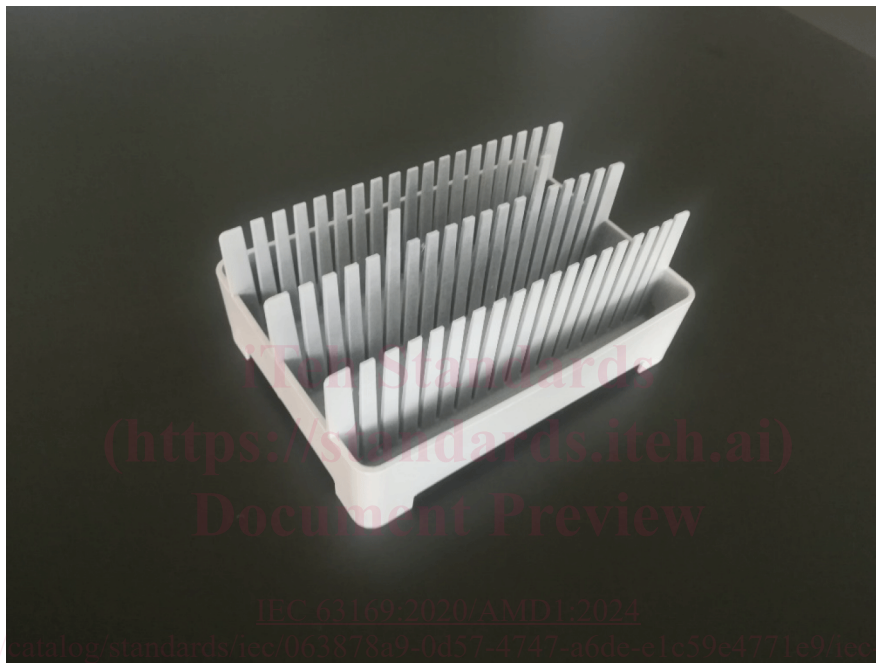
## Annex B – Test tray

Replace the existing Annex B with the following:

### Annex B (normative)

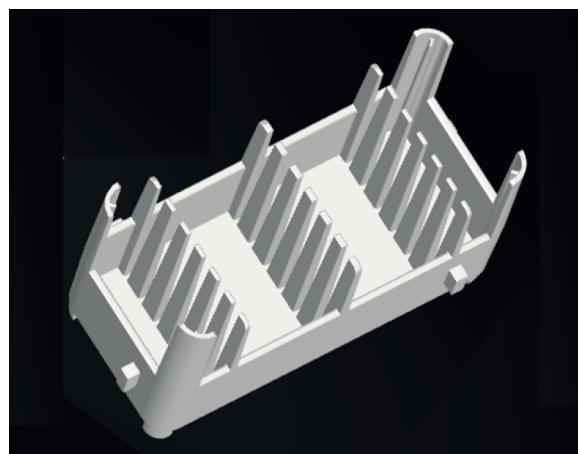
#### Weight loss and condensation test trays

This annex shows the **weight loss** and condensation **test trays**. The 18-sheet weight loss **test tray** is shown in Figure B.1. The 6-sheet weight loss **test tray** is shown in Figure B.2.



Nominal dimensions (mm): 196(L) × 141(W) × 90(H)

**Figure B.1 – 18-sheet weight loss test tray**



Nominal dimensions (mm): 151(L) × 75(W) × 81(H)

**Figure B.2 – 6-sheet condensation test tray**