IEC 63169

Edition 1.0 2020-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Electrical household and similar cooling and freezing appliances – Food preservation

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

IEC 63169:2020-06(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL HOUSEHOLD AND SIMILAR COOLING AND FREEZING APPLIANCES – FOOD PRESERVATION

FOREWORD

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International Standard IEC 63169 has been prepared by 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 International Standard is based on the following documents:

FDIS	Report on voting
59M/123/FDIS	59M/125/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this document, the following print types are used:

- terms defined in Clause 3 of this document, and in Clause 3 of IEC 62552-1:2015: **Arial bold**.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://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- withdrawn,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 1 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The **weight loss** test assesses some of the food care aspects of various **compartments**, **sub-compartments** and **convenience features** within a refrigerator. The test can be performed with real or artificial foods. Real foods have seasonal and regional variations, making them difficult for global use for repeatable and reproducible testing.

Research was carried out on materials, which proved that a particular non-woven material was suitable to use to replicate real food. This non-woven material is used to replicate **weight loss** from food in the **weight loss** test. Consequently, this document contains an artificial material weight loss test.

As much as possible, alignment has been made with the performance test standards IEC 62552-1 and IEC 62552-3.

This document contains a link to the SC 59M Supporting Documents that are available on the IEC website. The SC 59M Supporting Documents include the 3D printing files, referred to in Annex B. These files are intended to be used as a complement, and do not form an integral part of the document.

ELECTRICAL HOUSEHOLD AND SIMILAR COOLING AND FREEZING APPLIANCES – FOOD PRESERVATION

1 Scope

This document deals with a test to simulate the **weight loss** of leafy produce, given certain conditions of temperature, humidity and air movement in one or more **test zones**. The test can only be applied to spaces larger than 200 mm × 150 mm ×100 mm (L × W × H).

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 after a given duration.

NOTE **Weight loss** is one of the considerations for shelf life of produce. Other considerations such as condensation will be addressed in future amendments.

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.

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

IEC 62552-3:2015, *Household refrigerating appliances – Characteristics and test methods – Part 3: Energy consumption and volumes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62552-1:2015 and the following apply.

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
test zone
space inside the refrigeration appliance subject to the **weight loss** test

Note 1 to entry: This space is typically a vegetable drawer or crisper but can also be any other compartment, sub-compartment or convenience feature (see IEC 62552-1:2015, 3.3.1, 3.3.2 and 3.3.3, respectively). The manufacturer shall fully describe any **test zones** to be tested.

Note 2 to entry: Any zone in a refrigerator can be a **test zone**. A **test zone** needs to be separated or at least partially sealed from other zones in the same **compartment** or **sub-compartment**.

3.2
test tray
tray of specific dimensions containing a predefined number of **test sheets** which is charged with a predefined amount of water

Note 1 to entry: Refer to Annex B for 3D printing files. The **weight loss** test uses one large 18 **test sheet test tray** per **test zone**.

3.3
weight loss
weight of water lost from the **test tray** between two moments in time in [g]

3.4
weight loss rate
weight loss divided by the time difference between the two moments in time expressed in [g/24h]

3.5
test sheet
sheet of the nonwoven fabric specified in Annex A cut to a size of (75 mm × 125 mm) ± 1 mm.

4 Test preparation

4.1 Preparation and handling of test material

Table 1 – Test equipment

Test Tray	For 3D printing files (stp and stl files) for the test tray see: https://www.iec.ch/sc59m/supportingdocuments. The test tray shall be non-absorbent and watertight. This may be achieved by coating the test tray after the printing process.
Test sheet	Test sheets need to 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 Annex A. For a method of proving equivalence of alternate materials refer to Annex D.

If the **test tray** is not directly used after a test series, it should be stored as follows:

a) leave the test sheets inside the test tray;
b) discard the residual water from the test tray;
c) dry the test tray with the test sheets at ambient temperature and low humidity;
d) store the test tray loaded with test sheets in the fresh food compartment of a refrigerator in operation.

After storage, the **test tray** can be recharged with water for new tests. Annex A contains provisions for checking the quality of the non-woven fabric.

4.2 Installation and preparation of refrigerating appliance

The ambient temperature shall be 25 °C (see A.2.6, A.3.1, A.3.2 and A.4.5 of IEC 62552-1:2015).

The ambient humidity shall be in accordance with A.2.3 and A.3.6 of IEC 62552-1:2015.

The refrigerating appliance shall be installed in accordance with Annex B of IEC 62552-1:2015.

All internal accessories supplied with the refrigerating appliance shall be in their respective positions. See 5.1 in case these accessories interfere with the location of the **test tray**.

Before the test load is added, all **compartments** and **sub-compartments** shall be empty. Their temperatures shall be determined as specified in Annex D of IEC 62552-1:2015. The appliance shall be run until steady-state conditions are observed. Where user-operated baffles or controls are provided for adjustment of temperatures in **test zones,** each shall be adjusted to a setting in accordance with the instructions provided. If no specific instructions are provided, the setting shall be adjusted in accordance with the target temperature listed in Table 1 of IEC 62552-3:2015 within a tolerance of ±1 K.

Other **compartments** and **sub-compartments** shall be operated with temperatures as close as possible to the target temperatures as listed in Table 1 of IEC 62552-3:2015.

If the **test zone** is a **sub-compartment**, it shall be adjusted to a setting that results in a temperature of the **test zone** as close as possible to the specified target temperature in Table 1 of IEC 62552-3:2015. The temperature of the **test zone** shall be measured.

The temperature of a **compartment** or **sub-compartment** temperature shall be the average of temperature sensors placed in the positions as defined in Annex D of IEC 62552-1:2015.

4.3 Measurement sensor uncertainty

For temperature measurement uncertainty, reference is made to A.2.6 of IEC 62552-1:2015.

Because humidity measurement is optional, no uncertainty level is specified.

5 Weight loss test

5.1 Procedure

Remove any condensation from the **test zone** prior to placing the **test tray**.

The test material consists of a single large **test tray** with 18 **test sheets.**

The test may be carried out simultaneously on one or more of the **test zones**.

If some of the **test zones** are not being tested at this time, then a **test tray** is placed in each such **test zone** prior to starting the test. Weight measurements need not be taken for these **test trays**.

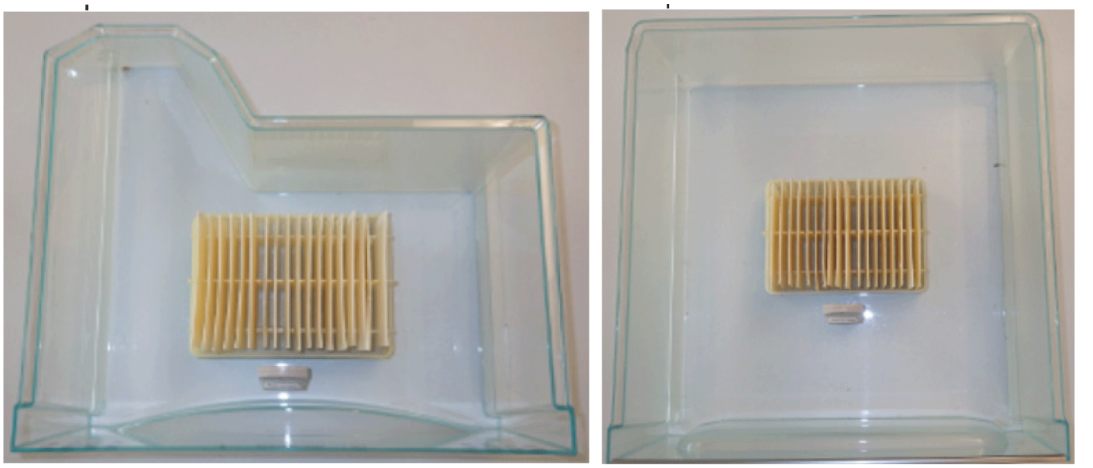
The **weight loss** test load is a single, large, 18-**test-sheet, test tray**. The **test tray** can be filled with dry or wet **test sheets**. If dry **test sheets** are used, then the **test tray** should be charged with 600 g ± 50 g of distilled water. Less water may be used if the **test sheets** are already wet.

Before starting the test, the quality of the **test tray** can be inspected as detailed in Clause A.3.

The **test tray** shall be placed in the centre of the base area of the **test zone** to be evaluated. If it is not possible to place the **test tray** in the centre (due to the height or shape of the space) then the **test tray** shall be placed in the centre of the next biggest area or the next possible place where the **test sheets** do not touch the upper surface of the space. The **test sheets** in the **test tray** shall face perpendicular to the refrigerator door if possible.

The **test tray** shall not touch the walls of the **test zone**.

Examples of the **test tray** placement are shown in Figure 1.



IEC

Figure 1 – Examples of test tray placement

If a **test tray** cannot be placed due to the presence of an accessory, the accessory shall be placed in accordance with the instructions and the **test tray** placed next to it.

If no specific instructions are provided:

a) in the case of a removable accessory at the required position, the accessory shall be removed;

b) in the case of a non-removable accessory but where it can be shifted with respect to the required position, the accessory shall be moved in the width direction to the right or in the depth direction to the back.

During the test, the water shall not freeze.

The temperature of the water in the **test tray** shall be within ±2 K of the temperature of the **test zone** to be evaluated. The **test tray** shall be preconditioned for 24 h to ensure it is within ±2 K of the temperature of the **test zone** to be evaluated. Preconditioning can be in the **test zone** or in another refrigerator.

A temperature sensing element shall be placed 1 cm in front of the **test tray** and shall not be in contact with the **test tray**. If wired sensors are used, the wires shall be mounted such so they do not cross sealing surfaces of the **test zone**.

The maximum duration of door openings for loading and unloading of **test tray**s shall be 1 min.

The **test tray** is then loaded into the **test zone** for another 24 h conditioning. After the conditioning, the weight of the **test tray** shall be measured (M_1 [g]) and the time (t_1 [h]) taken. The weight shall be determined with a resolution of 0,1 g and the time with a resolution of 1 min.

At least 24 hours after time t_1, the weight of the **test tray** shall again be measured (M_2 [g]) and the time recorded (t_2 [h]). The time taken to measure M_2 shall be less than 2 min.

The difference between M_1 and M_2 shall not be greater than 200 g.

Immediately after a test, another test may be conducted using the same **test zone** for the 24 h conditioning.

5.2 Weight loss calculation.

The **weight loss rate** is calculated as follows:

$$W = [(M_1 - M_2)/(t_2 - t_1)] \times 24 \text{ [g/24h]}$$

The **weight loss** test is concluded after the measurement of M_2 and the **weight loss rate** calculation.

For a suggested test report format, refer to Annex C. For guidance on expected uncertainty, refer to Annex E.

Annex A
(informative)

Non-woven material specifications

A.1 General

The products cited in this annex are examples of suitable products available commercially[1].

A.2 Non-woven fabric specification 1

Specification for Brune 02 (3614) Humidifier Filter Pads

Product	Humidifier filter pad with holes and additive
Raw materials	Wetlaid cellulose 330 g/m^2. Additive added during manufacture is Wax shell.
Final dimensions	(370 mm × 440 mm) ± 5 mm
Wax	440 mm long. Saturated down from one long edge
Punched holes	13 mm from long edge where wax/crush line has been input and 90 mm from each edge forming a gap of 260 mm between the centre of each hole

- Supplier of already cut sheets

  Lerch Raumklima GmbH

  Faistenbergerstrasse 6

  81545 München

  Germany

  Tel: +49 (0)89 64 74 95

  Fax: +49 (0)89 642 18 68

  E-Mail: info@lerch24.de

  Internet: www.lerch-raumklima.de

- Supplier of non-woven material

  www.brune-humidifier.com/shop/filters/filters-for-radiator-evaporators.html

A.3 Visual inspection of test trays

Figure A.1 gives guidance in deciding whether the **test sheets** are fit for use or reuse in testing. Care should be taken to avoid contact between **test sheets**.

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[1] This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of these brands or suppliers. Equivalent products may be used if they can be shown to lead to the same results.