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Household refrigerating appliances - Characteristics and test methods - Part 3: Energy consumption and volume (IEC 62552-3:2015 , modified)

Appareils de réfrigération à usage ménager -  
Caractéristiques et méthodes d'essai - Partie 3:  
Consommation d'énergie et volume  
(IEC 62552-3:2015 , modifiée)

Haushaltskühlgeräte - Eigenschaften und Prüfverfahren -  
Teil 3: Energieverbrauch und Rauminhalt  
(IEC 62552-3:2015 , modifiziert)

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Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## Contents

## Page

European foreword .....	3
1 Modification to the Introduction .....	4
2 Modification to Clause 3, "Terms, definitions and symbols" .....	4
3 Modification to Clause 5, "Target temperatures for energy determination" .....	4
4 Modifications to Clause 6, "Determination of energy consumption" .....	4
5 Modification to Annex A, "Set up for Energy testing" .....	5
6 Modifications to Annex B, "Determination of steady state power and temperature" .....	5
7 Modifications to Annex C, "Defrost and recovery energy and temperature change" .....	5
8 Modifications to Annex D, "Defrost interval" .....	6
9 Modifications to Annex F, "Energy consumption of specified auxiliaries" .....	8
10 Modifications to Annex G, "Determination of load processing efficiency" .....	9
11 Modifications to Annex H, "Determination of volume" .....	10
12 Modifications to Annex I, "Worked examples of energy consumption calculations" .....	13
13 Addition of Annex ZA, "Chill compartment temperature control test" .....	15
14 Addition of Annex ZB, "Normative references to international publications with their corresponding European publications" .....	16
15 Addition of Annexes ZZA, "Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) 2019/2019 aimed to be covered" .....	17
16 Addition of Annexes ZZB, "Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) 2019/2016 aimed to be covered" .....	18
17 Addition of Bibliography .....	20

## European foreword

This document (EN 62552-3:2020) consists of the text of IEC 62552-3:2015 prepared by IEC/TC 59 "Performance of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 59X "Performance of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-02-24
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2023-02-24

This standard in combination with standards EN 62552-1:2020 and EN 62552-2:2020 will supersede EN 62552:2013.

This standard shall be read in combination with standards EN 62552-1:2020 and EN 62552-2:2020.

EN 62552-3:2020 includes the following significant technical changes:

- a) definition of the "regional function", i.e. calculation formula for annual energy consumption for Europe;
- b) some clauses have been completely modified, i.e. D.3, F.1 and H.2.2;
- c) adding of H.Z1 and Figures H.Z1, H.Z2, H.Z3, H.Z4 and H.Z5.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62552-3:2015 are prefixed "Z".

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under Standardization Request M/459 given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

### Endorsement notice

The text of IEC 62552-3:2015 was approved by CENELEC as a European Standard with agreed common modifications.



## 1 Modification to the Introduction

Add the following paragraph:

"This standard was developed in relationship with Regulations (EU) 2019/2016 of 11.3.2019 on energy labelling and (EU) 2019/2019 of 1.10.2019 on ecodesign for refrigerating appliances."

## 2 Modification to Clause 3, "Terms, definitions and symbols"

Add the following definition:

### "3.1.Z1

**low noise refrigerating appliance**  
refrigerating appliance without vapour compression and with airborne acoustical noise emission lower than 27 A-weighted decibel referred to 1 pico Watt [dB(A) re 1 pW]"

## 3 Modification to Clause 5, "Target temperatures for energy determination"

Add the following subclause:

### "5.Z1 Controllability of temperatures in a compartment

The standard does generally not include tests for the controllability of temperatures in a compartment (i.e. how well the temperature is kept constant during changing environmental conditions without the user having to adjust temperature control settings). The exception is the chill compartment for which a chill compartment temperature control test has been included in Annex ZA."

## 4 Modifications to Clause 6, "Determination of energy consumption"

In 6.8.5, "Total energy consumption", delete the sentence " $E_{aux}$  expressed as an integrated energy value over a year".

Replace the seventh and eighth paragraph and Formula (4) with:

"The total annual energy consumption of a refrigerating appliance  $E_{total}$  (except for **low noise refrigerating appliances**) can be given by:

$$E_{total} = f \{ E_{daily16^{\circ}C}, E_{daily32^{\circ}C} \} + E_{aux} \quad (4)$$

where

$f$  is a regional function to give the annual energy based on daily energy at 16 °C and 32 °C. In this standard this function is defined as:

$$f \{ E_{daily16^{\circ}C}, E_{daily32^{\circ}C} \} = ( Day_{16^{\circ}C} \times E_{Daily16^{\circ}C} ) + ( Day_{32^{\circ}C} \times E_{Daily32^{\circ}C} )$$

where  $Day_{16^{\circ}C} = Day_{32^{\circ}C} = 365/2$  days = 182,5 days;

see Annex I for examples by taking into account  $D_{16^{\circ}C} = D_{32^{\circ}C} = 365/2$  d = 182,5 days;

$E_{aux}$  is the annual energy from ambient controlled anti-condensation heater(s) as described in Annex F. See I.5 for an example how to calculate this auxiliary.

The  $E_{total}$  shall be calculated in according the following equation:

$$E_{total} = 182,5 \times E_{daily16^{\circ}C} + 182,5 \times E_{daily32^{\circ}C} + E_{aux}$$

For **low noise refrigerating appliances**, the energy consumption shall be determined as provided for in Formula 4, but at an ambient temperature of 25 °C instead of at 16 °C and 32 °C.

$E_{daily}$ , expressed in kWh/24h and rounded to three decimal places for the calculation of the  $AE$  is then as follows:

$$E_{daily} = E_{25}$$

where  $E_{25}$  is  $E_T$  at an ambient temperature of 25 °C and derived by interpolation of the energy tests at the target temperatures listed in Table 1."

## 5 Modification to Annex A, "Set up for Energy testing"

Replace the first paragraph of A.2.6.5, "Position of the temperature sensor in automatic ice-makers" with:

"An automatic ice-maker bin shall have a single temperature sensor located in the position specified as follows for all energy tests:"

## Modifications to Annex B, "Determination of steady state power and temperature"

In B.4.3, "Case SS2 calculation of values", replace Formula (13) with:

$$T_{SS2-i} = (T_{av-endX-endY-i}) - \left[ \frac{\Delta Th_{dfj-i}}{(t_{end-Y} - t_{end-X})} \right] \quad (13)"$$

In B.4.3, "Case SS2 calculation of values", replace item  $\Delta Th_{dfj-i}$  under Formula (13) with:

"

$\Delta Th_{dfj-i}$  is the accumulated temperature difference over time in each **compartment**  $i$  in Kh as determined in accordance with C.3.3 for the **defrost and recovery period**  $j$  commencing at the end of Period X"

In B.4.3, "Case SS2 calculation of values", replace Formula (14) with:

$$CRt_{SS2} = \frac{Rt_{end-Y} - Rt_{end-X} - \Delta t_{drj}}{(t_{end-Y} - t_{end-X})} \quad (14)"$$

In B.4.3, "Case SS2 calculation of values", replace item  $\Delta t_{dr}$  under Formula (14) with:

"

$\Delta t_{drj}$  is the additional compressor run time in h as determined in accordance with C.3.3 for the **defrost and recovery period**  $j$  commencing at the end of period X"

## 7 Modifications to Annex C, "Defrost and recovery energy and temperature change"

In C.3.3, "Case DF1 calculation of values" add the following after the NOTE:

"During a **load processing efficiency** test, it is possible that one or more defrosts occur for which a correction shall be made. This correction is based on splitting the defrost and recovery energy in a fixed part and the energy used by the defrost heater:

Fixed defrost adder is:

$$\Delta E_{df-adder,j} = \Delta E_{df,j} - E_{df-heater,j} \quad (19a)$$

where:



$E_{df-adder,j}$  is the energy used by the defrost heater during the **defrost and recovery period**  $j$  in Wh."  
In C.4, "Number of valid defrost and recovery periods", add the following note at the end:

"NOTE Z1 The defrost heater energy  $\Delta E_{df-adder,j}$  and incremental defrost and recovery energy  $\Delta E_{df,j}$  for new appliances and appliances that have not been operated for some time could be initially low until the defrost heater energy stabilizes."

In C.5, "Calculation of representative defrost energy and temperature", replace Formula 22 with:

$$\Delta E_{df} = F_{df} \frac{\sum_{j=1}^m \Delta E_{df,j}}{m} \quad (22)$$

In C.5, "Calculation of representative defrost energy and temperature", add the following text below the line  $\Delta E_{df,j}$ :

" $F_{df}$  is a regional scaling factor which can be used to compensate for frost load and usage factor which impacts the defrosts intervals. The value for  $F_{df}$  is set to 1,0."

In C.5, "Calculation of representative defrost energy and temperature", add the following text above Formula (23):

"For correcting a **load processing efficiency** tests where one or more defrosts occurs, a representative value for the fixed defrost adder is defined:"

In C.5, "Calculation of representative defrost energy and temperature", replace Formula 23 with:

$$\Delta E_{df-adder} = \frac{\sum_{j=1}^m \Delta E_{df-adder,j}}{m} \quad (23)$$

## 8 Modifications to Annex D, "Defrost interval"

In D.2, "Elapsed time defrost controllers", replace Note 2 with:

"NOTE 2 The same timers could be used as compressor run time controllers or as elapsed time controllers, depending on how they are configured in the refrigerating appliance."

Replace the entire subclause of D.3, "Compressor run time defrost controllers" with:

"For these controllers, the **defrost interval** is defined by the compressor run time (or on time in hours) (or in some cases the compressor run time plus the maximum time allocated for defrost heater operation). These controllers are only applicable to single speed compressors. The **defrost interval** is therefore approximately inversely proportional to the total heat load on the refrigeration system (**ambient temperature** and user loads plus any internal heat loads). The most common defrost run time controllers range from 6 h to 12 h of compressor run time. Typically this would result in **defrost intervals** of the order of 12 h to 30 h (elapsed time) at elevated **ambient temperatures** and somewhat longer **defrost intervals** at lower **ambient temperatures**.

NOTE 1 The same timers could be used as compressor run time controllers or as elapsed time controllers, depending on how they are configured in the **refrigerating appliance**.

If the run time controller is not accessible (or where it is not clear whether the controller is a run time controller) or where the laboratory is not able to directly measure the controller operation and does not know its run time, the value for the proxy run time shall be measured by testing as set out below. Any routine energy tests or other tests may be used for this purpose.

Each measurement shall be undertaken over a whole **defrost control cycle** and tests shall be undertaken in at least two different **ambient temperatures** in order to verify that it is a run time controller and to estimate the value of  $t_{prt}$ . The period selected shall comply with the following requirements:



- The first defrost shall qualify as a valid defrost as specified in C.3;
- the test period shall include at least part of the subsequent **defrost and recovery period** that is initiated automatically without any intervention (defrost heater on).

The estimated proxy run time of the compressor run time defrost controller for a given set of test data that complies with these requirements is given by:

$$t_{prt,j} = t_{crt,j} + t_{dh,j} \quad (25)$$

where

$t_{prt,j}$  is the estimated proxy run time of the compressor run time defrost controller for the test period starting with **defrost and recovery period**  $j$  in h;

$t_{crt,j}$  is the measured compressor run time in h from the initiation of defrost heater operation for **defrost and recovery period**  $j$  to the initiation of defrost heater operation for the subsequent **defrost and recovery period**  $j + 1$ ;

$t_{dh,j}$  is the time from the start of the defrost heater on until the compressor restarts in h during **defrost and recovery period**  $j$  where the timer advances during the heater operation; otherwise a value of zero if the timer does not advance during the heater operation.

A common configuration is that the defrost heater is allocated a fixed maximum time of operation in the timer defrost controller (for example 20 min). The actual heater on time will vary depending on the frost load for the specific defrost. So the time between the heater off and the compressor on may vary, but the total time from heater on to compressor on should be constant in this configuration. Where the laboratory has any doubt about the appliance configuration, it is assumed that the defrost timer does not advance when the defrost heater is on, so that only compressor on time is counted and the value of  $t_{dh,j}$  is set to zero in Formula (25).

Additional routine tests undertaken at other **ambient temperatures** and/or **temperature control settings**, including user related loads such as door openings and small **processing loads** should be reviewed to assess defrosting behaviour. The observed **defrost interval** should be consistent with the measured proxy run time, otherwise it shall be classified as a **variable defrost** controller.

NOTE 2 These tests can be used to detect whether the run time controller is over-ridden by some other control mechanism during **normal use** conditions.

To qualify as a compressor run time defrost controller, the coefficient of variation (standard deviation divided by the mean) of the measured values for either compressor proxy run time  $t_{prt,j}$  or compressor run time alone  $t_{crt,j}$  shall be less than 5 % for the **defrost intervals** examined. Where the product does not comply with this requirement, it shall be classified as a **variable defrost** controller. The value of  $t_{prt}$  used in subsequent calculations shall be the average of all measured values of  $t_{prt,j}$ .

Once confirmed, the proxy run time can be used to calculate the actual **defrost interval** (in elapsed time) for any **temperature control setting**, **ambient temperature** and load processing condition, as a function of the compressor run time. For all **refrigerating appliances** with compressor run time defrost controllers, the percentage run time shall be reported for **steady-state** conditions in Annex B and the extra compressor run time (in h) shall be calculated for **defrost and recovery periods** (in Annex C, Formula (21)). The **defrost interval** for each test condition and **temperature control setting** is given by:

$$t_{df} = \frac{t_{prt} - \Delta t_{dr}}{CRt_{SS}} = \frac{t_{crt} - \Delta t_{dr}}{CRt_{SS}} \quad (26)$$

where

- $t_{df}$  is the estimated **defrost interval** (elapsed time) for each **temperature control setting** and **ambient temperature** under test in h, including the impact of **defrost and recovery**
- $t_{prt}$  is the representative measured proxy run time of the compressor run time defrost controller (in h) in accordance with Formula (25)
- $CRT_{SS}$  is the compressor run time (as a percentage) during the **steady-state** operation for each **temperature control setting** and **ambient temperature** under test as determined in B.3.3 or B.4.3
- $\Delta t_{dr}$  is the representative incremental compressor run time (in hours) for **defrost and recovery** in accordance with Formula (25)
- $t_{dh}$  is the representative time from the start of the defrost heater on until the compressor restarts in h during a **defrost and recovery period** where the timer advances during the heater operation, otherwise a value of zero
- is the representative compressor run time in h from the initiation of one defrost heater operation until the initiation of the next defrost heater operation (this can be determined from rearranging Formula (25)).

NOTE Z1 The exclusion of heater on time  $t_{dh,j}$  and  $t_{dh}$  is the default assumption for calculations in Formula (25) and Formula (26). If the defrost timer does not advance during the defrost heater operation or if the laboratory is unsure, then the value of  $t_{dh,j}$  and  $t_{dh}$  is set to be zero for both equations. It is essential to apply consistently heater on time  $t_{dh,j}$  and  $t_{dh}$  in Formula (25) and Formula (26)."

In D.4.2, "Variable defrost controllers – declared defrost intervals", replace the first bullet of third paragraph with:

"—  $\Delta t_{d-min}$  shall not exceed 12 h at an **ambient temperature** of 32 °C (elapsed time)."

## 9 Modifications to Annex F, "Energy consumption of specified auxiliaries"

In F.2.5, "Calculation of power consumption", add the following sentence and Note Z1:

"The data as set out in Table F.1 shall be used.

NOTE Z1 Values ( $R_1$  to  $R_{30}$ ) are defined based on the weather data of Karlsruhe/Germany covering the years 1998 to 2007. Power values that are specific to these regional values ( $P_{H1}$  to  $P_{H30}$  for bins  $R_1$  to  $R_{30}$ ) are normally provided by the product supplier or manufacturer."

Replace Table F.1 with:

"

**Table F.1 — Format for temperature and humidity data – Ambient controlled anti-condensation heaters**

Relative Humidity	RH band mid-point	Probability $R_i$ at 16 °C	Probability $R_i$ at 22 °C	Probability $R_i$ at 32 °C	Heater W at 16 °C	Heater W at 22 °C	Heater W at 32 °C
0 to 10 %	5 %	0,00 %	0,00 %	0,34 %	$P_{H1}$	$P_{H11}$	$P_{H21}$
10 to 20 %	15 %	0,61 %	6,86 %	2,01 %	$P_{H2}$	$P_{H12}$	$P_{H22}$
20 to 30 %	25 %	3,11 %	14,57 %	1,61 %	$P_{H3}$	$P_{H13}$	$P_{H23}$
30 to 40 %	35 %	5,03 %	14,83 %	0,86 %	$P_{H4}$	$P_{H14}$	$P_{H24}$
40 to 50 %	45 %	5,09 %	11,67 %	0,18 %	$P_{H5}$	$P_{H15}$	$P_{H25}$
50 to 60 %	55 %	4,67 %	8,31 %	0,01 %	$P_{H6}$	$P_{H16}$	$P_{H26}$
60 to 70 %	65 %	3,39 %	5,54 %	0,00 %	$P_{H7}$	$P_{H17}$	$P_{H27}$



Relative Humidity	RH band mid-point	Probability $R_i$ at 16 °C	Probability $R_i$ at 22 °C	Probability $R_i$ at 32 °C	Heater W at 16 °C	Heater W at 22 °C	Heater W at 32 °C
70 to 80 %	75 %	3,17 %	2,51 %	0,00 %	$P_{H8}$	$P_{H18}$	$P_{H28}$
80 to 90 %	85 %	2,85 %	0,66 %	0,00 %	$P_{H9}$	$P_{H19}$	$P_{H29}$
90 to 100 %	95 %	2,05 %	0,07 %	0,00 %	$P_{H10}$	$P_{H20}$	$P_{H30}$

Replace Formula (40) and the text just above and below with the following:

"The heater power can be calculated as follows:

$$W_{heaters} = \left[ \sum_{i=1}^k (R_i \times P_{Hi}) \right] \times 1,3 \quad (40)$$

where

$W_{heaters}$  is the annual average additional power consumption associated with the ambient controlled anti-condensation heater;

$R_i$  is a regional factor to indicate the probability of the  $i$ -th temperature and humidity bin in Table F.1;

$P_{h,i}$  is the average heater power associated with the  $i$ -th temperature and humidity bin in Table F.1,

$k$  is the total number of temperature and humidity bins used (= 30 if all bins in Table F.1 are used);

1,3 is the assumed loss factor (is the energy used by the heater (1,0) plus a loss component of 0,3 to account for heat leakage into the **compartment** and its subsequent removal by the refrigeration system)."

## 10 Modifications to Annex G, "Determination of load processing efficiency"

In G 5.3, "Quantification of additional energy used to process the load", replace Formula 51 and the text below with:

$$\Delta E_{additional-test} = (E_{end} - E_{start}) - P_{after} \times (t_{end} - t_{start}) - \sum_{i=1}^n (z_i \times \Delta E_{df-adder,i}) - \sum_{i=1}^n E_{df-heater,ij}$$

"

(51)

where

$\Delta E_{additional-test}$  is the additional energy consumed by the **refrigerating appliance** during the test to fully process the loaded added as specified in Clause G.3;

$E_{start}$  is the accumulated energy reading at the start of **load processing efficiency** test as defined in G.4.1 in Wh;

$E_{end}$  is the accumulated energy reading at the end of **load processing efficiency** test as defined in G.4.4 in Wh;

$P_{after}$  is the **steady-state** power consumption that occurs after the load has been fully processed during the valid energy test period (Clause B.3 or Clause B.4) as defined in G.4.4 in W;

$t_{start}$	is the test time at the start of <b>load processing efficiency</b> test as defined in G.4.1 in h;
$t_{end}$	is the test time at the end of <b>load processing efficiency</b> test as defined in G.4.4 in h;
$\Delta E_{df-adder,i}$	is the average defrost adder calculated in Annex C for all valid defrosts specified for defrost system $i$ for the relevant ambient temperature;
$n$	is the number of defrost systems in the appliance;
$z$	is a count of the number of defrosts that occur for defrost system $i$ ;
$E_{df-heater,ij}$	is the sum of the defrost heater energy for the $j$ defrosts that occur during the load processing test for each defrost system $i$ ."

In G.5.5 "Load processing multiplier", modify first sentence of the second paragraph with:

where a load multiplier is used to estimate the additional energy associated with a **processing load**, it is important to calculate a normalized value for  $E_{input-nominal}$  in order to correct for small variations in **compartment** temperatures and **ambient temperature** conditions that occur during a test."

## 11 Modifications to Annex H, "Determination of volume"

Replace H.2.2, "Determination of volume" with:

"The **volume** shall take into account the exact shapes of the walls including all depressions or projections. For through the door ice and water dispensers, the ice chute shall be included in the **volume** up to the dispensing function.

The items below shall be considered as being in place and their **volumes** deducted:

- a) The **volume** of control housings, including integral parts of it.
- b) The **volume** of the **evaporator** space (which includes any space made inaccessible by the **evaporator**) (see H.2.3).
- c) The **volume** of air ducts required for proper cooling and operation of the unit.
- d) Space occupied by **shelves** moulded into the inner door panel.
- e) The **volume** of any insulating partition between **compartments** and/or **sub-compartments**. An average thickness of greater than 5 mm is considered to be an insulating partition.

For clarification, the through the door ice and water dispensers and the insulating hump are not included in the **volume**. No part of the dispenser unit shall be included as **volume**.

NOTE Z1 When the **volume** is determined, internal fittings are considered as not being in place, such as

- **shelves**;
- removable partitions;
- containers;
- convenience features (not classified as sub-compartments);
- interior light housings and lights."

In H.2.3, "**Volume of evaporator space**" replace item c) and add item:



- "c) In the case of **refrigerant** filled shelving, the **volume** above the uppermost shelf and below the lowermost shelf, if the distance between the shelf and the nearest horizontal plane of the cabinet inner wall is less than or equal to 50 mm. All refrigerated shelves are considered as not present.
- d) In the case where a fan is installed in an **unfrozen compartment** with a refrigerated wall evaporator or a plate style evaporator, the **volume** of the fan and the fan scroll."

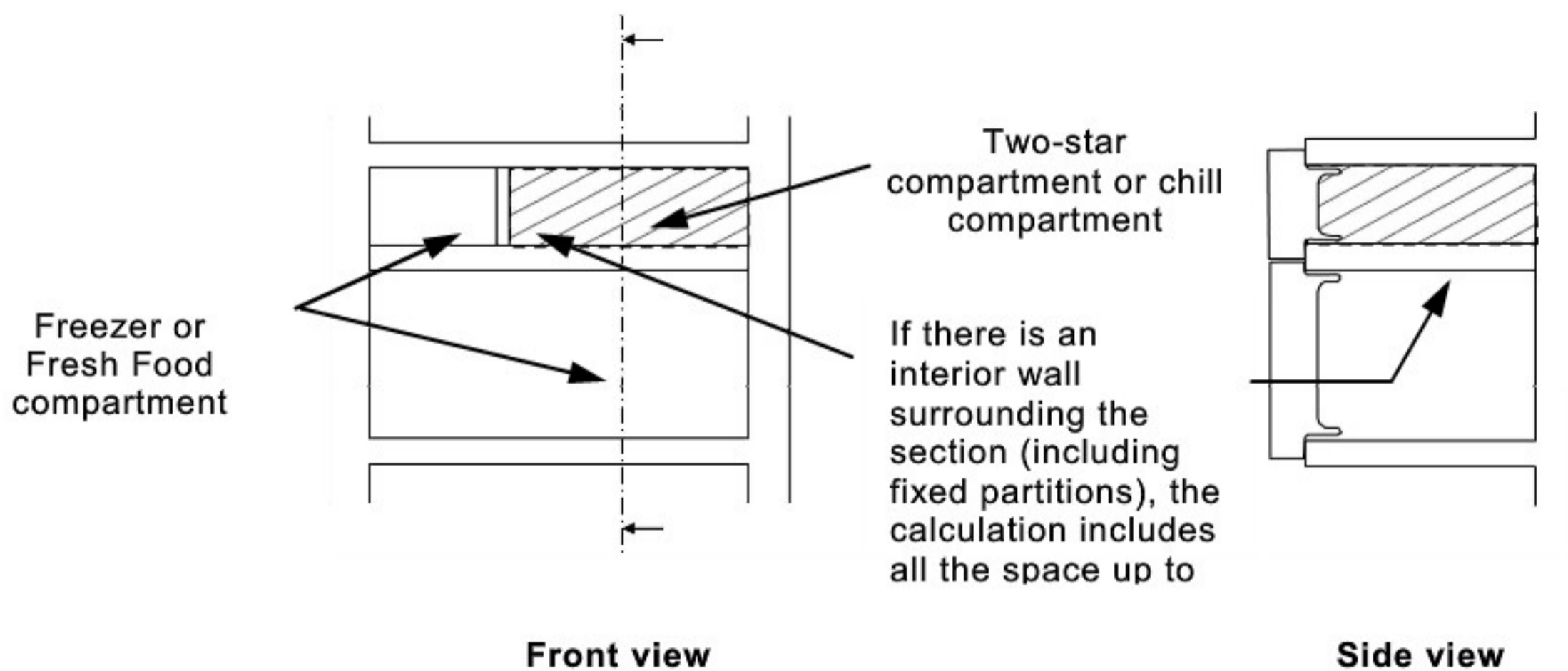
**Add the following** subclause H.Z1:

**"H.Z1 Calculation of the volume of the section or sub-compartment in the compartment whose target temperatures are different from each other**

Calculation of the volume of the section or sub-compartment in the compartment whose target temperatures are different from each other

Figures H.Z1 to H.Z5 show typical examples of volume calculation for a **two-star section or compartment** inside the **freezer compartment (three-star or four-star)** and should be considered as generic examples. The examples shown in Figures H.Z1 to H.Z5 may be combined to adapt the calculation to be representative of the section or **compartment** in the **refrigerating appliance** under consideration.

Figures H.Z1, H.Z2 and H.Z4 can also be applied to a **chill sub-compartment** inside a **fresh food compartment**.



**Figure H.Z1 — Part with partition in the freezer is a two-star compartment (or a chill compartment next to a fresh food compartment)**

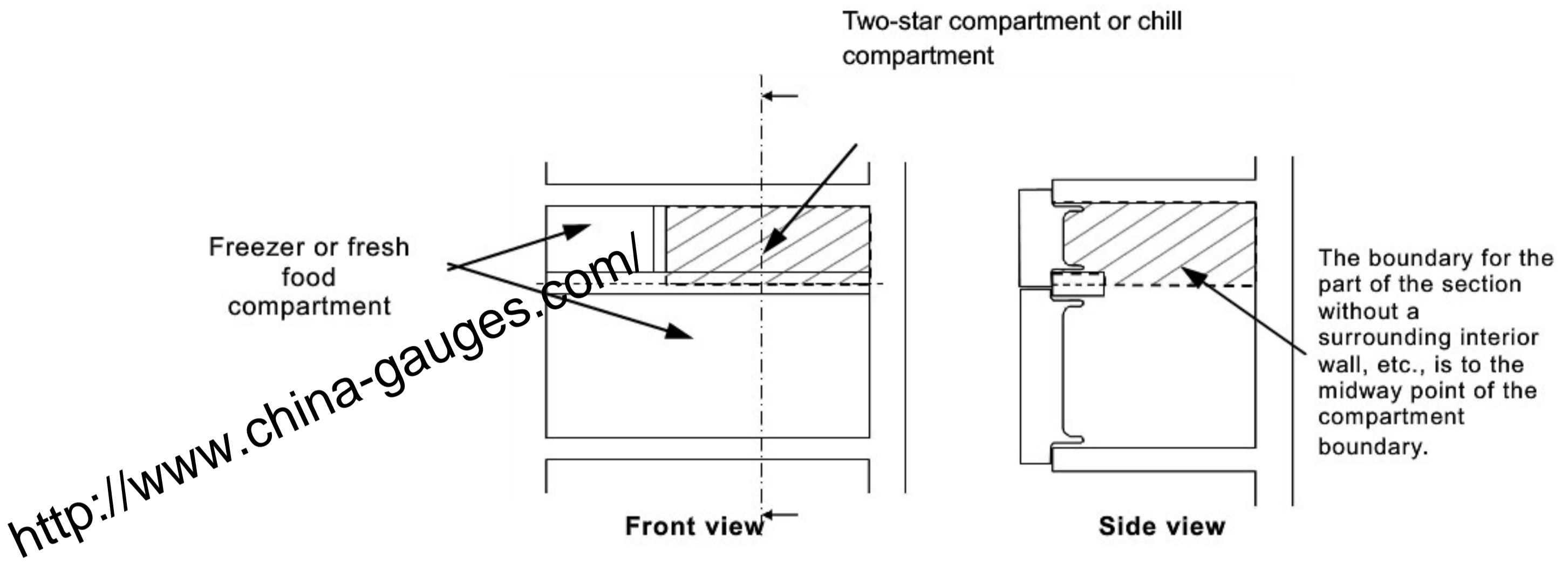


Figure H.Z2 — Part without partition next to the freezer or fresh food compartment is a two-star compartment or a chill compartment, respectively

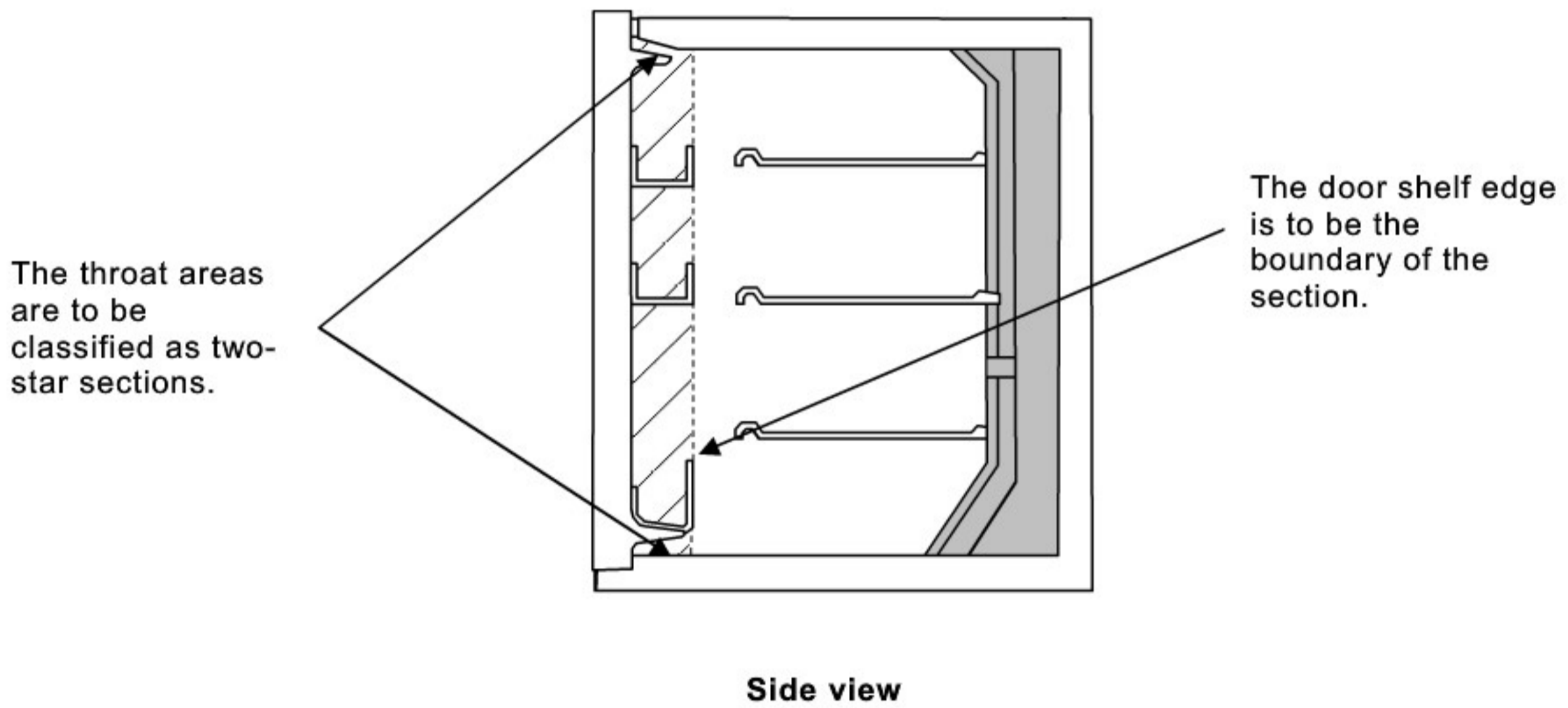
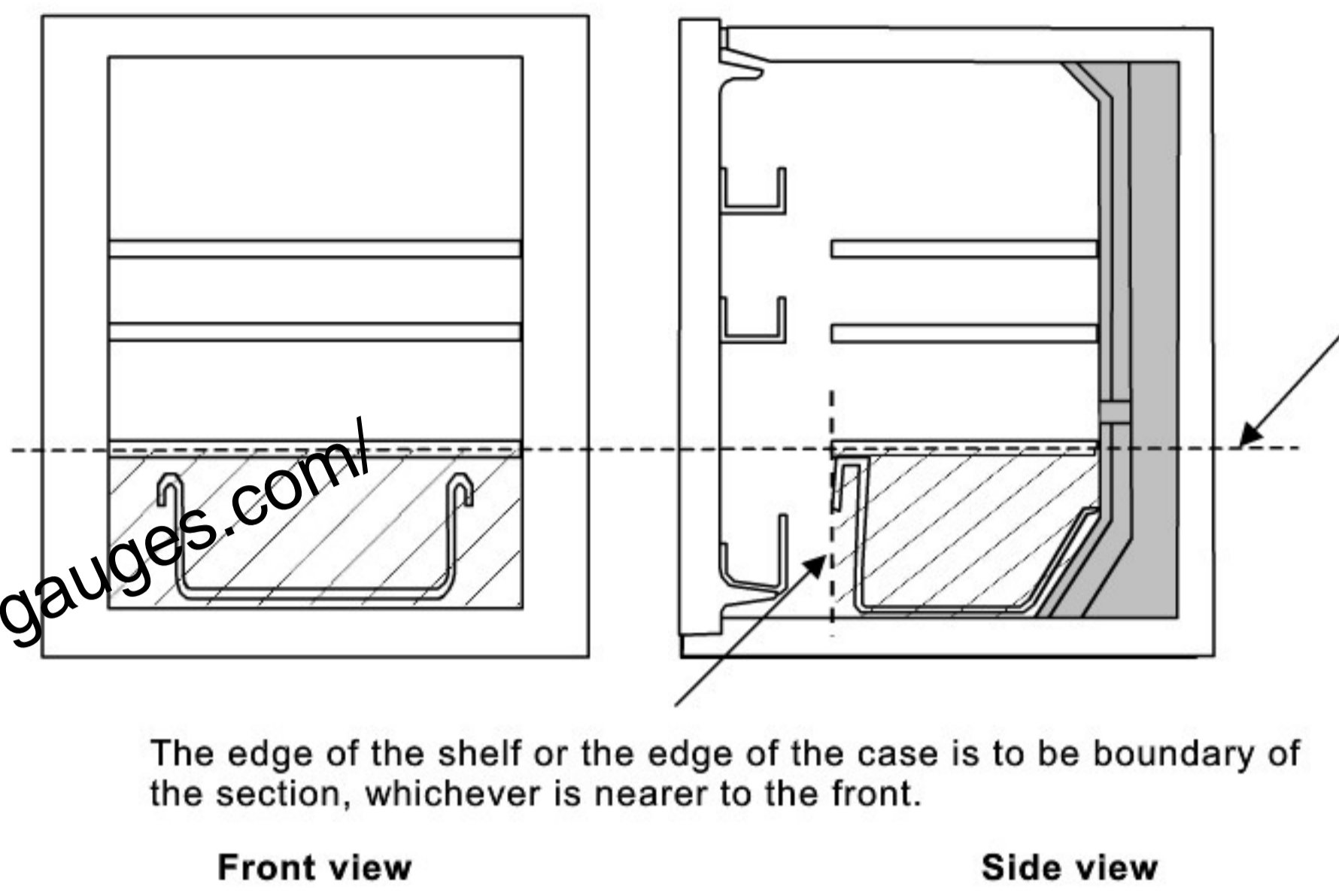


Figure H.Z3 — Freezer door shelves are a two-star section

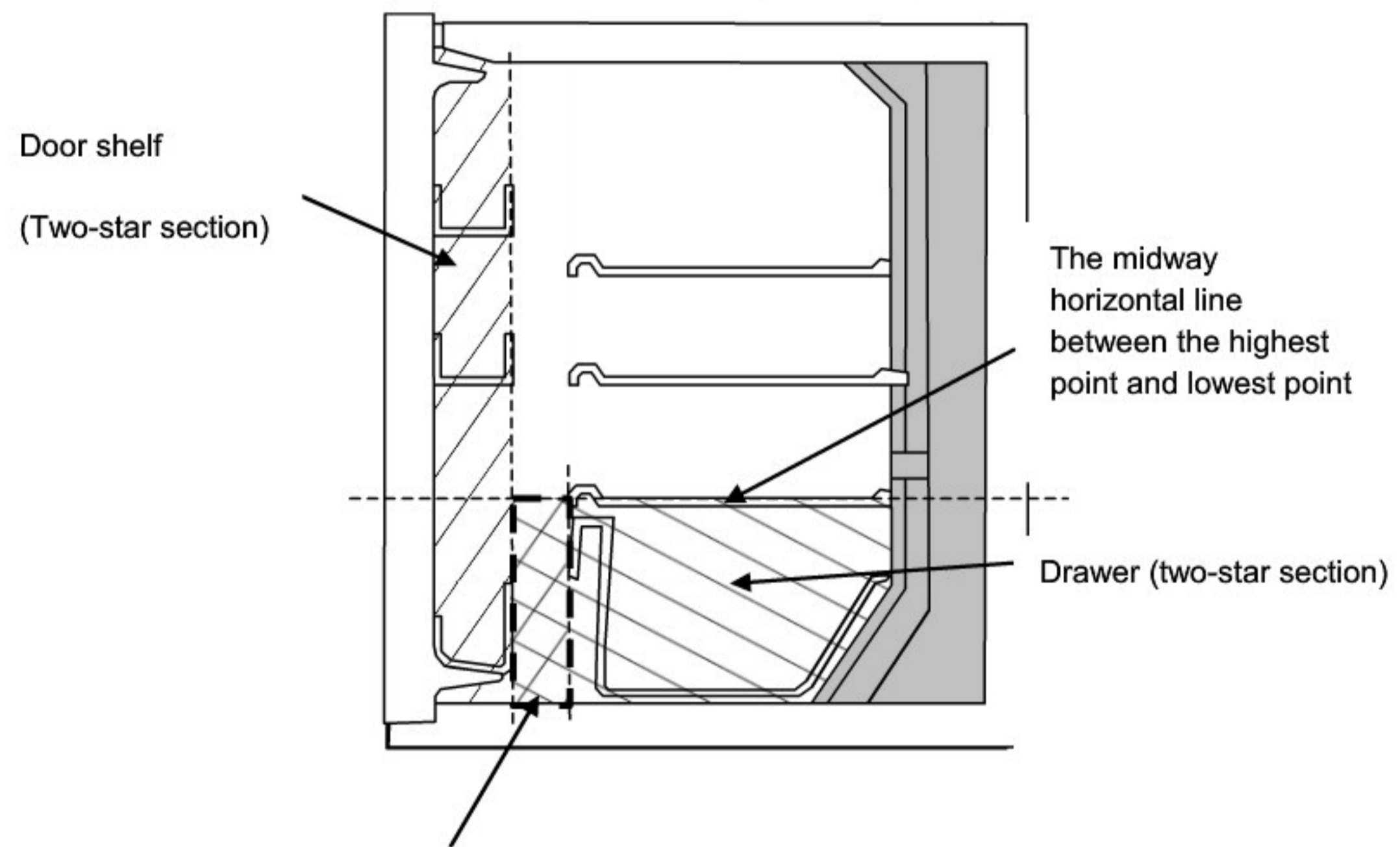
The midway point of the thickness of the shelf is to be the boundary of the section.



<http://www.china-gauges.com/>



**Figure H.Z4 — Drawer in the freezer is a two-star section (or a chill sub-compartment in a fresh food compartment)**



**Figure H.Z5 — Space between a door shelf and drawer-type two-star section"**

**12 Modifications to Annex I, "Worked examples of energy consumption calculations"**

In 1.2, "Variable defrost – calculation of defrost intervals" replace definition of  $\Delta t_{d-min}$  with:  
 "—  $\Delta t_{d-min}$  shall not exceed 12 h at an ambient temperature of 32 °C (elapsed time)."

In 1.7, "Determination of annual energy consumption", replace the eighth paragraph with:

"The regional equivalent operating factors for a **refrigerating appliance** are:

- Annual days operating at an **ambient temperature** of 16 °C equivalent is 182,5 days ( $Day_{16}$ );
- Annual days operating at an **ambient temperature** of 32 °C equivalent is 182,5 days ( $Day_{32}$ ).

$$Day_{16} + Day_{32} = 365 \text{ days}$$

A regional function of the annual energy at 16 °C and 32 °C is expressed as follows:

$$E_{total} = f \{ E_{daily16C}, E_{daily32C} \} + E_{aux} + \Delta E_{processing-annual} \quad (Z1)$$

$$E_{total} = (Day_{16} \times E_{daily16C}) + (Day_{32} \times E_{daily32C}) + (E_{aux}) + (\Delta E_{processing-annual})$$

$$E_{total} = ((182,5 \times 597/1000)) + (182,5 \times 1230/1000) + (27,51) + (182,5 \times 135 / (1,47 \times 1000)) + (182,5 \times 390 / (1,15 \times 1000)) \text{ kWh/year}$$

$$E_{total} = (108,95 + 224,47 + 27,51 + 16,76 + 61,89) \text{ kWh/year}$$

$$E_{total} = 439,58 \text{ kWh/year}$$

NOTE The factor of 1 000 in this formula converts the units of Wh/d to kWh/d. Care is required to make sure all units are consistent."

In I.5, "Automatically controlled anti-condensation heater(s)", replace Table I.9 with:

"Table I.9 — Example of population-weighted humidity probabilities and heater wattages at 16 °C, 22 °C and 32 °C

RH band mid-point	Regional Probability, $R_i$			Average heater power $P_{Hi}$ (in W) (from manufacturer)			Probability times power at each ambient temperature		
	16 °C	22 °C	32 °C	16 °C	22 °C	32 °C	16 °C	22 °C	32 °C
5 %	0,00 %	0,00 %	0,34 %	0	0	0	0,0000	0,0000	0,0000
15 %	0,61 %	6,86 %	2,01 %	0	0	1	0,0000	0,0000	0,0201
25 %	3,11 %	14,57 %	1,61 %	0	1	2	0,0000	0,1457	0,0322
35 %	5,03 %	14,83 %	0,86 %	0	2	3	0,0000	0,3966	0,0258
45 %	5,09 %	11,67 %	0,18 %	1	2	4	0,0509	0,2334	0,0720
55 %	4,67 %	8,31 %	0,01 %	1	3	5	0,0467	0,2493	0,0050
65 %	3,39 %	5,54 %	0,00 %	1	3	6	0,0339	0,1662	0,0000
75 %	3,17 %	2,51 %	0,00 %	2	4	7	0,0634	0,1004	0,0000
85 %	2,85 %	0,66 %	0,00 %	2	5	8	0,0570	0,0330	0,0000
95 %	2,05 %	0,07 %	0,00 %	3	6	9	0,0615	0,0042	0,0000
<b>Total</b>	30 %	65 %	5 %						

NOTE The example in this table is based on the weather data of Karlsruhe/Germany covering the years 1998 to 2007 for a hypothetical **refrigerating appliance**.



### 13 Addition of Annex ZA, “Chill compartment temperature control test”

Add the following Annex ZA:

”

#### Annex ZA (normative)

#### Chill compartment temperature control test

A chill compartment shall be able to control its average temperature within a certain range without user-adjustments of its control. This shall be checked during a set of temperature control tests which consists of two parts: reference tests at 32 °C and verification tests at 16 °C. All temperature control tests shall be performed as prescribed for the energy consumption tests. The controller setting of the chill compartment, if present, shall be the same for all temperature control tests.

Note Z1 In general all or part of the temperature control tests can also be used for the energy consumption determination.

Determine the reference chill compartment temperature  $T_{ccma,ref}$  by performing one or more reference tests at 32 °C ambient.  $T_{ccma,ref}$  is the interpolated value of  $T_{ccma}$  according Annex E and all reference tests shall be valid tests for interpolation subject to the following conditions:

- a) If the temperature control of the chill compartment is not adjustable by the user, the chill compartment is tested in the condition as delivered.
- b) If the temperature control of the chill compartment is accessible to the user (e.g. visible control on the display or by following manufacturer instructions), it is set to a position which leads to an interpolated temperature of  $T_{ccma}$  at or as close as possible below the target temperature (+2 °C) .

The interpolation can be to the target temperature(s) of any controlled compartment present, with the exception of the chill compartment as the controller setting shall be the same for each reference test.

Perform one or more verification tests at 16 °C ambient temperature with the same temperature control setting of the chill compartment as applied at 32 °C. Other control settings shall be such that the controlled compartments are within 4 K of their target temperature, with the exception of the fresh food compartment, where, if present, the fresh food compartment temperature  $T_{ma}$  shall be in the range from 2 °C to 6 °C.

For each of these verification tests,  $T_{ccma}$  shall be within  $T_{ccma,ref} \pm 1,5$  K. An example of a temperature control diagram is given in Figure Z1. In case any of the verification tests is not complying with this requirement, the compartment shall not be classified as a chill compartment.

It is allowed to perform the reference tests for determining  $T_{ccma,ref}$  at 16 °C ambient temperature and perform the verification tests at 32 °C.

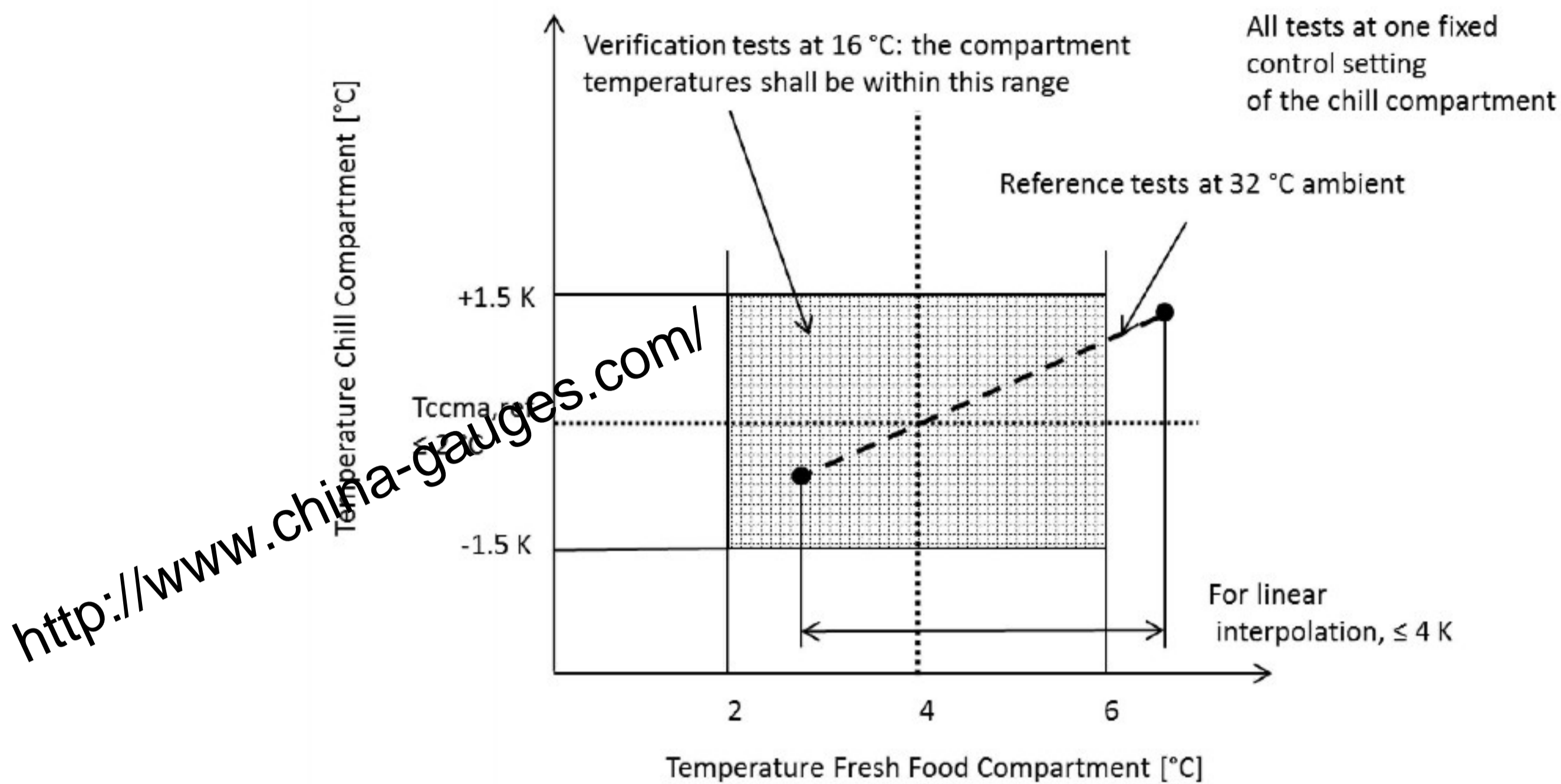


Figure Z1 – Example of a temperature control diagram for a combination appliance with a fresh food and chill compartment

#### 14 Addition of Annex ZB, “Normative references to international publications with their corresponding European publications”

Add the following Annex ZB:

”

##### Annex ZB (normative)

##### Normative references to international publications with their corresponding European publications

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.

NOTE Z1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE Z2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).



<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62552-1 (mod)	2015	Household refrigerating appliances – Characteristics and test methods – Part 1: General requirements	EN 62552-1	2020
IEC 62552-2 (mod)	2015	Household refrigerating appliances – Characteristics and test methods – Part 2: Performance requirements	EN 62552-2	2020

**15 Addition of Annexes ZZA, "Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) 2019/2019 aimed to be covered"**

**Annex ZZA**  
(informative)

**Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) 2019/2019 aimed to be covered**

This European standard has been prepared under a Commission's standardisation request "Mandate to CEN, CENELEC and ETSI for Standardisation in the field of household refrigerating appliances", M/459 (2009) to provide one voluntary means of conforming to the ecodesign requirements of Commission Regulation (EU) 2019/2019 of 1.10.2019 laying down ecodesign requirements for refrigerating appliances pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 643/2009 [OJEU L315/187 of 5.12.2019].

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding ecodesign requirements of that Regulation and associated EFTA Regulations.

**Table ZZA.1 – Correspondence between this European Standard and Commission Regulation (EU) 2019/2019 of 1.10.2019 laying down ecodesign requirements for refrigerating appliances pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 643/2009 [OJEU L315/187 of 5.12.2019] and Commission's standardisation request "Mandate to CEN, CENELEC and ETSI for Standardisation in the field of household refrigerating appliances", M/459 (2009)**

<b>Ecodesign requirements of Regulation No 2019/2019 [OJEU L315/187 of 5.12.2019]</b>	<b>Clause(s) / sub-clause(s) of this EN</b>	<b>Remarks/ Notes</b>
Art. 6 Circumvention	Clause 7	
Article 4.4 Anti-condensation heater that can be switched on and off by the end-user	Annex F.2.6, F.2.7, F.2.8	
Article 4.4	Annex F.2.5	

<b>Ecodesign requirements of Regulation No 2019/2019 [OJEU L315/187 of 5.12.2019]</b>	<b>Clause(s) / sub-clause(s) of this EN</b>	<b>Remarks/ Notes</b>
Ambient controlled anti-condensation heaters		
Article 4.4 Chill requirements	Annex ZA	
Article 4.4, Annex II, 1 a), Table 1 and 1 b), Table 2 Energy efficiency index	Clauses 4, 5, 6, 8	
Article 4.4, Annex II, 1 a), Table 1 and 1 b), Table 2 Energy efficiency index for low noise refrigerators	Clause 6	

**WARNING 1:** Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2:** Other Union legislation may be applicable to the products falling within the scope of this standard."

**16 Addition of Annexes ZZB, "Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) 2019/2016 aimed to be covered"**

"

**Annex ZZB**  
(informative)

**Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) 2019/2016 aimed to be covered**

This European standard has been prepared under a Commission's standardisation request "Mandate to CEN, CENELEC and ETSI for Standardisation in the field of household refrigerating appliances", M/459 (2009) to provide one voluntary means of conforming to the energy labelling requirements of Commission Delegated Regulation (EU) 2019/2016 of 11.3.2019 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of refrigerating appliances and repealing Commission Delegated Regulation (EU) No 1060/2010 [OJEU L315/102 of 5.12.2019].

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZZB.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding energy labelling requirements of that Regulation and associated EFTA Regulations.



**Table ZZB.1 – Correspondence between this European Standard and Commission Delegated Regulation (EU) 2019/2016 of 11.3.2019 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of refrigerating appliances and repealing Commission Delegated Regulation (EU) No 1060/2010 [OJEU L315/102 of 5.12.2019] and Commission’s standardisation request “Mandate to CEN, CENELEC and ETSI for Standardisation in the field of household refrigerating appliances”, M/459 (2009)**

Energy labelling Requirements of Regulation No 2019/2016 [OJEU L315/102 of 5.12.2019]	Clause(s) / sub-clause(s) of this EN	Remarks/ Notes
Annex VI, Table 7 (general product specification) Anti-condensation heater that can be switched on and off by the end-user	Annex F.2.6, F.2.7, F.2.8	
Annex VI, Table 7 (general product specification) Ambient controlled anti-condensation heaters	Annex F.2.5	
Annex V, Table 6 (compartment parameters); Annex VI, Table 7 (compartment specifications) Chill requirements	Annex ZA	
Annex III, 1.2.V. and 2.2.V.; Annex V, Table 6 (general product parameters); Annex VI, Table 7 (general product specifications) Energy consumption and energy efficiency index	Clauses 4, 5, 6, 8	
Annex III, 1.2 and 2.2; Annex IV, 4 a); Annex V, Table 6 (compartment parameters) Compartment volume and total volume	Annex H	

**WARNING 1:** Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2:** Other Union legislation may be applicable to the products falling within the scope of this standard."

## 17 Addition of Bibliography

Add the following Bibliography:

"

### Bibliography

COMMISSION DELEGATED REGULATION (EU) 2019/2016 of 11.3.2019 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of refrigerating appliances and repealing Commission Delegated Regulation (EU) No 1060/2010

COMMISSION REGULATION (EU) 2019/2019 of 1.10.2019 laying down ecodesign requirements for refrigerating appliances pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 643/2009

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