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ANNEXES 1 to 5

ANNEXES

to the

COMMISSION REGULATION (EU) .../...

laying down ecodesign requirements for refrigerating appliances with a direct sales functon pursuant to Directive 2009/125/EC of the European Parliament and of the Council

ANNEX I
Definitions applicable for the Annexes

The following definitions shall apply:

(1) ‘energy efficiency index’ (EEI) means an index number for the relative energy efficiency of a refrigeration appliance with a direct sales function expressed in percentage, calculated in accordance with point 2 of Annex III;

(2) ‘vacuum insulation panel (VIP)’ means an insulation panel consisting of a firm, highly-porous material encased in a thin, gas-tight outer envelope, from which the gases are evacuated and which is sealed to prevent outside gases from entering the panel;

(3) ‘spare part’ means a separate part that can replace a part with the same or similar function in a product;

(4) ‘door gasket’ means a mechanical seal which fills the space between the door and the cabinet of the refrigerating appliance with a direct sales function to prevent leakage from the cabinet to the outdoor air;

(5) ‘blowing agent’ means the gas trapped in the bubbles forming the insulation panel (typically PUR foams in a closed-cell shape) of a cabinet, this gas expands and to support the structure and gives it insulating properties;

(6) ‘commercial guarantee’ means any undertaking by the trader or a producer (the guarantor) to the consumer, in addition to any legal obligation relating to the guarantee of conformity, to:

  (a) reimburse the price paid; or

  (b) replace, repair or service goods in any way if they do not meet the specifications or any other requirements not related to conformity set out in the guarantee statement or in the relevant advertising available at the time of, or before, the conclusion of the contract;

(7) ‘product database’ means a collection of data on products, which is arranged in a systematic manner and consists of a consumer-oriented public part, where information concerning individual product parameters is accessible by electronic means, an online portal for accessibility and a compliance part, with clearly specified accessibility and security requirements, as referred to in Regulation (EU) 2017/1369 of the European Parliament and of the Council[1];

(8) ‘equivalent model’ means a model with the same relevant technical and performance characteristics but placed on the market under a different model identifier;

(9) ‘operating temperature’ means the reference temperature inside a compartment during testing;

(10) ‘M’ and ‘N’ means modelling parameters that take into account the volume-dependence of the energy use, with values as set out in Table 4, Annex III;

(11) ‘annual energy consumption’ (*AE*) means the average daily energy consumption multiplied with 365 (days per year), expressed in kilowatt hour (kWh), calculated in accordance with point 2(b) of Annex III;

[1] Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (OJ L 198, 28.7.2017, p. 1).

(12) ‘daily energy consumption’ (E_{daily}) means the electricity used by a refrigerating appliance with a direct sales function over 24 hours at reference conditions, expressed in kilowatt hour per day (kWh/24h);

(13) ‘standard annual energy consumption’ (*SAE*) means the reference annual energy consumption of a refrigeration appliance, expressed in kilowatt hour (kWh), calculated in accordance with point 2(c) of Annex III;

(14) ‘beverage cooler’ means a refrigerating appliance with a direct sales function designed to cool at a specified speed, packaged non-perishable beverages loaded at ambient temperature, for sale at specified temperatures below the ambient temperature, which allows to access the beverages directly through open sides or through one or more doors, drawers or both. The temperature inside the cooler may be allowed to increase during periods of no demand, for the purpose of energy saving, in view of the non-perishable nature of beverages;

(15) ‘ice-cream freezer’ means a horizontal closed cabinet intended to store and/or display and sell pre-packed ice cream, where access by the consumer to the pre-packed ice cream is achieved by opening a solid or transparent lid from the top, with a net volume ≤ 600 litres (l) and, only in the case of transparent lid ice-cream freezers, a net volume divided by the TDA ≥ 0,35 meter (m);

(16) ‘transparent lid’ means a door made of a transparent material that allows the user to clearly see items through it;

(17) ‘total display area (TDA)’ means the total visible items area, including visible area through glazing, defined by the sum of horizontal and vertical projected surface areas of the net volume, expressed in dm^3 or liters;

(18) ‘gelato-scooping cabinet’ means a refrigerating appliance with a direct sales function in which ice-cream can be stored, displayed and scooped, within prescribed temperature limits;

(19) ‘semi-vertical cabinet’ means a vertical cabinet whose overall height does not exceed 1,5 meter (m) and that has either a vertical or inclined display opening;

(20) ‘combined cabinet’ means a refrigerating appliance with a direct sales function which combines display and opening directions from a vertical, a horizontal or a semi-vertical cabinet;

(21) ‘supermarket cabinet’ means a refrigerating appliance with a direct sales function intended for the sale and display of items in retail applications, such as in supermarkets, including refrigerator or freezers, but excluding beverage coolers, refrigerated vending machines, gelato-scooping cabinets and ice-cream freezers;

(22) ‘roll-in cabinet’ means a cabinet which enables goods to be displayed directly on their pallets or rolls which can be placed inside by lifting, swinging, or removing the lower front part, where fitted;

(23) ‘M-package’ means a test package fitted with a temperature measuring device;

(24) ‘multi-temperature vending machine’ means a refrigerated vending machine including at least two compartments with different operating temperatures.

ANNEX II
Ecodesign requirements

1. Energy efficiency requirements:

(a) From 1 September 2020, the EEI of refrigerating appliances with a direct sales function shall not be above the values as set out in Table 1.

Table 1: Maximum EEI for refrigerating appliances with a direct sales function, expressed in % from 01/09/2020 onwards

	EEI
All refrigerating appliances with a direct sales function	110

(b) From 1 September 2023, the EEI of refrigerating appliances with a direct sales function shall not be above the values in Table 2.

Table 2: Maximum EEI for refrigerating appliances with a direct sales function, expressed in % from 01/09/2023 onwards

	EEI
All refrigerating appliances with a direct sales function	80

2. Functional requirements and requirements on repair and end-of-life aspects:

From 1 September 2020, refrigerating appliances with a direct sales function shall meet the following requirements:

(a) if the refrigerating appliances with a direct sales function contains a VIP, the VIP shall be labelled with the letters 'VIP' in a clearly visible and readable way;

(b) manufacturers shall ensure that refrigerating appliances with a direct sales function are designed so that the components referred to in Annex VII of Directive 2012/19/EU can be identified and removed with non-proprietary and commonly available tools. The appliance shall be designed so that no gluing or welding fastening technique is encountered for any of the dismantling operations leading to the removal of these components. Within two weeks of a request made by a market surveillance authority or a recycler, manufacturers shall provide them with technical instructions illustrating the operations needed to access the relevant components, including: the type of operation, the type and number of fastening technique(s) to be unlocked, and the tool(s) to be used;

(c) manufacturers shall make available necessary spare parts, including at least thermostats, temperature sensors and printed circuit boards, for their refrigerating appliances with a direct sales function for at least 6 years after the production of the specific model has ceased;

(d) if a refrigerating appliance with a direct sales function contains door gaskets and light sources, these shall be replaceable without special tools and without permanent damage, and manufacturers shall make available door gaskets and light sources to end-users for their refrigerating appliances for at least 6 years after the production of the specific model has ceased;

(e) manufacturers of refrigerating appliances with a direct sales function shall mark in the back panel of the appliances the chemical name of the principal component of the blowing agent used in the insulation of the appliance. In case of using flammable blowing agents, manufacturers shall mark the appliance with the applicable international warning symbol for flammable material or fire hazard.

3. Information requirements:

(a) From 1 September 2020, instruction manuals for installers and end-users, and free access websites of manufacturers, their authorised representatives and importers shall include the following information, in the order as set out below:

(1) the recommended setting of temperatures in each compartment for optimum food preservation;

(2) instructions for the correct installation and maintenance of the refrigerating appliance with a direct sales function;

(3) access to professional repair (internet webpages, addresses, contact details);

(4) relevant information for ordering spare parts, directly or through other channels provided by the manufacturer;

(5) the minimum period during which spare parts, necessary for the repair of the refrigerating appliance with a direct sales function, are available;

(6) the duration of the commercial guarantee of the refrigerating appliance with a direct sales function offered by the manufacturer;

(7) a weblink that links the product database, as defined in Commission Delegated Regulation (EU) *[OP- Please insert here the references of the energy labelling regulation]*[2]; on the free access website this weblink shall link the model information as stored in the product database.

(b) The information shall also include a list equivalent models.

(c) The technical documentation for the purposes of conformity assessment pursuant to Article 4 shall include the information in the order and as set out in Table 6 of Regulation *[OP - Please insert here references of the energy labelling regulation for refrigerating appliances with a direct sales function]*. For market surveillance purposes, manufacturers may refer to the technical documentation uploaded to the product database that contains the same information as per Regulation (EU) *[OP - Please insert here references of the energy labelling regulation for refrigerating appliances with a direct sales function]*.

[2] Commission Delegated Regulation (EU) *[OP - please enter regulation number] of [OP – please enter date]* supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to the energy labelling of refrigerating appliances with a direct sales function (*[OP-please insert the reference to the OJ]*).

ANNEX III
Measurement and calculation methods

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art methods and are in line with the following provisions set out below. The reference numbers of these harmonised standards have been published for this purpose in the *Official Journal of the European Union*.

1. General conditions for testing:

(a) the ambient conditions shall correspond to Set 1 as set out in Table 3, except for ice-cream freezers and gelato scooping cabinets which shall be tested in ambient conditions corresponding to Set 2 set out in Table 3;

(b) where or a compartment can be set to different temperatures, it shall be tested at the lowest operating temperature;

(c) refrigerated vending machines with compartments with variable volumes shall be tested with the volume of the compartment with the highest operating temperature is adjusted to its minimum volume.

Table 3: Ambient conditions

	Dry bulb temperature, °C	Relative humidity, %	Dew point, °C	Water vapour mass in dry air, g/kg
Set 1	25	60	16,7	12,0
Set 2	30	55	20,0	14,8

2. Determination of the EEI:

(a) For all refrigerating appliances with a direct sales function, the EEI, expressed in % and rounded to the first decimal place, compares the *AE* (in kWh/a) with the reference *SAE* (in kWh/a) and is calculated as:

$$EEI = AE / SAE.$$

(b) The *AE*, expressed in kWh/a and rounded to two decimal places, is calculated as follows:

$$AE = 365 \cdot E_{daily};$$

with:

AE is the sum of the *AE* of all compartments of the cabinet.

E_{daily} is the energy consumption of the cabinet over 24 hours, expressed in kWh/24h and rounded to three decimal places.

The *SAE*, expressed in kWh/a and rounded to two decimal places, is calculated as follows. For cabinets with multiple temperature classes, the *SAE* is calculated separately for each compartment and added together to obtain the total *SAE* of the cabinet:

$$SAE = (M + N \cdot Y) \cdot 365 \cdot C \cdot P$$

with:

(1) M and N are the coefficient values of the modelling parameters per cabinet type and are given in Table 4. For roll-in cabinets the values in Table 4 shall apply from 1 September 2023; from 1 September 2020 to 31 August 2023 the values for roll-in cabinets shall be M = 9,2 and N = 11,6.

Table 4: M and N coefficient values of the modelling parameters

Category	Value for M	Value for N
Beverage coolers	2,1	0,006
Ice-cream freezers	2,0	0,009
Refrigerated vending machines	4,1	0,004
Gelato-scooping cabinets	25	30,4
Vertical, semi-vertical and combined supermarket refrigerator cabinets	9,1*	9,1*
Horizontal supermarket refrigerator cabinets	3,7	3,5
Vertical, semi-vertical and combined supermarket freezer cabinets	7,5	19,3
Horizontal supermarket freezer cabinets	4,0	10,3

(2) C is the temperature coefficient value per cabinet type and the values are given in Table 5.

(3) as regards the coefficient Y:

(a) for beverage coolers:

Y is the equivalent volume of the appliance (*Veq*), calculated as follows:

$$Y = Veq = GrossVolume \ ((25 - Tc)/20) \cdot Cc$$

where *Tc* is the average compartment classification temperature of the compartment and *Cc* is the climate class factor. The values for *Tc* are set out in Table 6. The values for *Cc* are set out in Table 7.

Table 5: Temperature coefficient values, C

(a) Supermarket cabinets					
Category	**Name of the class****	**Highest temperature of warmest M-package (°C)**	**Lowest temperature of coldest M-package (°C)**	**Highest minimum temperature of all M-package (°C)**	**Value for C**
Vertical, semi-vertical and combined supermarket refrigerator cabinet	M2	≤ +7	≥ −1	n.a.	1
	H1 and H2	≤ +10	≥ −1	n.a.	0,82
	M1	≤ +5	≥ −1	n.a.	1,15
Horizontal supermarket refrigerator cabinets	M2	≤ +7	≥ −1	n.a.	1
	H1 and H2	≤ +10	≥ −1	n.a.	0,92
	M1	≤ +5	≥ −1	n.a.	1,08
Vertical, semi-vertical and combined supermarket freezer cabinets	L1	≤ −15	n.a.	≤ −18	1
	L2	≤ −12	n.a.	≤ −18	0,9
	L3	≤ −12	n.a.	≤ −15	0,9
Horizontal supermarket freezer cabinets	L1	≤ −15	n.a.	≤ −18	1
	L2	≤ −12	n.a.	≤ −18	0,92
	L3	≤ −12	n.a.	≤ −15	0,92

(b) Refrigerated vending machines			
Category	**Name of the class*****	**Maximum measured product temperature (T_V) (°C)**	**Value for C**
Refrigerated vending machine	Category 1	7	$1+(12-T_V)/25$
	Category 2	12	
	Category 3	3	
	Category 4	$(T_{V1}+T_{V2})/2$	
	Category 5	25	
	Category 6	$(T_{V1}+T_{V2})/2$*	

(c) other appliances	
Category	**Value for C**
Other appliances	1

Notes:
* For multi-temperature vending machines, T_V shall be the average of T_{V1} (the maximum measured product temperature in the warmest compartment) and T_{V2} (the maximum measured product temperature in the coldest compartment).
** Following EN ISO 23953-2:2015.
*** Following EN 50597:2018.
n.a = not applicable

Table 6: *Tc* values for beverage coolers

Class of the beverage cooler*	***Tc (°C)***
K1	+3,5
K2	+2,5
K3	−1
K4	+5
Note: *The classes of the beverage cooler are defined according to EN 16902.	

Table 7: Cc values for beverage coolers

Warmest temperature of the beverage cooler (°C)	***Relative humidity of the beverage cooler (%)***	***Cc***
+25	60	1,00
+32	65	1,05
+40	75	1,10

(b) for ice-cream freezers:

Y is the equivalent volume of the appliance (*Veq*), calculated as follows:

$$Y = Veq = NetVolume \cdot ((12 - Tc)/30) \cdot Cc$$

where *Tc* is the average compartment classification temperature of the compartment and *Cc* is the climate class factor. The values for *Tc* are set out in Table 8. The values for *Cc* are set out in Table 9.

Table 8: *Tc* values for ice-cream freezers

Class of the ice-cream freezer		***Tc (°C)***
Warmest M-package temperature colder or equal to in all tests (except lid opening test) (°C)	***Warmest M-package maximum temperature rise allowed during the lid opening test (°C)***	
-18	2	-18
-7	2	-7

Table 9: Cc values for ice-cream freezers

Ice-cream freezer type	*Operating conditions of the ice-cream freezer*				*Cc*
	Minimum		*Maximum*		
	Temperature (°C)	*Relative humidity (%)*	*Temperature (°C)*	*Relative humidity (%)*	
Ice-cream freezer with transparent lid	16	80	30	55	1,00
			35	75	1,10
			40	40	1,20
Ice-cream freezer with solid lid	16	80	30	55	1,00
			35	75	1,04
			40	40	1,10

(c) for refrigerated vending machines:

Y is the volume of the appliance, which is the sum of the volumes of all compartments of the cabinet, expressed in litres. For refrigerated vending machines the net volume shall be used and only those compartments that are directly available for vending without service visit shall be taken into account.

(d) for all other cabinets:

Y is the TDA, which is the sum of the display areas of all compartments of the cabinet, expressed in square meters (m^2).

(4) P is the coefficient to distiguish between remote and non-remote cabinets. The values for P set out in Table 10.

Table 10: P values

Cabinet type	*P*
Non-remote supermarket cabinets	1,10
Other cabinets	1,00

ANNEX IV
Verification procedure for market surveillance purposes

The verification tolerances defined in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer or importer as an allowed tolerance to establish the values in the technical documentation or in interpreting these values with a view to achieving compliance or to communicate better performance by any means.

When verifying the compliance of a product model with the requirements laid down in this Regulation pursuant to point 2 of Article 3 of Directive 2009/125/EC, the authorities of the Member States shall apply the following procedure for the requirements referred to in Annex II:

1. The Member State authorities shall verify one single unit of the model.

2. The model shall be considered to comply with the applicable requirements if:

(a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values), and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer or importer than the results of the corresponding measurements carried out pursuant to paragraph (g) thereof; and

(b) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer or importer does not contain values that are more favourable for the manufacturer or importer than the declared values; and

(c) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as given in Table 11; and

(d) when the Member State authorities check the unit of the model, it complies with the functional requirements and the requirements on repair and end-of-life aspects.

3. If the results referred to in point 2(a), (b) and (d) are not achieved, the model and all models that have been listed as equivalent refrigerating appliance with a direct sales function models in the manufacturer's or importer's technical documentation shall be considered not to comply with this Regulation.

4. If the result referred to in point 2(c) is not achieved, the Member State authorities shall select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more different models that have been listed as equivalent models in the manufacturer's or importer's technical documentation.

5. The model shall be considered to comply with the applicable requirements if, for these three units, the arithmetical mean of the determined values complies with the respective verification tolerances given in Table 11.

6. If the result referred to in point 5 is not achieved, the model and all models that have been listed as equivalent refrigerating appliance with a direct sales function models

in the manufacturer's or importer's technical documentation shall be considered not to comply with this Regulation.

7. The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay after a decision being taken on the non-compliance of the model according to points 3 and 6.

The Member State authorities shall use the measurement and calculation methods set out in Annex III.

The Member State authorities shall only apply the verification tolerances that are set out in Table 11 and shall use only the procedure described in points 1 to 7 for the requirements referred to in this Annex. No other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 11: Verification tolerances

Parameter	Verificatio
Net volume, gross volume or TDA	The determined value shall not be more than 3% or 1 l lower – whichever is the greater value – than the declared value.
AE	The determined value shall not be more than 10% higher than the declared value.

ANNEX V
Benchmarks

At the time of entry into force of this Regulation, the best available technology on the market for refrigerating appliances with a direct sales function in terms of their EEI was identified as outlined below.

	TDA (m^2), net volume (l) or gross volume (l) as applicable	T_1 or T_V	*AE* (kWh/yr)
Supermarket cabinets (Vertical refrigerator)	3,3		4526 (= 12,4 kWh/day)
Supermarket cabinets (Horizontal refrigerator)	2,2		2044 (=5,6 kWh/day)
Supermarket cabinets (Vertical freezer)	3		9709 (=26,6 kWh/day)
Supermarket cabinets (Horizontal freezer)	1,36 or 2,76		2336 (= 6,4 kWh/day) or 6424 (=17,6 kWh/day)
Can and bottle machine	548	7 °C*	1547 (= 4,24 kWh/day)
Spiral refrigerated vending machine	472	3 °C	2070 (= 5,67 kWh/day in ready mode)
Beverage cooler	520		511 (= 1,4 kWh/day)
Ice-cream freezer	302		584 (= 1,6 kWh/day)
Gelato-scooping cabinet	1,43		10862 (= 29,76 kWh/day)

* This temperature is higher than the normal maximum measured product temperature for these appliances, which is between 3 °C and 5 °C.