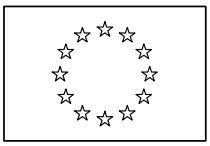

COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, XXX
C(2009) YYY final

COMMISSION REGULATION (EC) No …/…

of …

implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for household refrigerating appliances

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implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for household refrigerating appliances

(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council[1], and in particular Article 15(1) thereof,

After consulting the Ecodesign Consultation Forum,

Whereas:

(1) Directive 96/57/EC of the European Parliament and of the Council of 3 September 1996 on energy efficiency requirements for household electric refrigerators, freezers and combinations thereof[2] lays down provisions regarding household refrigerating appliances. The requirements laid down in that Directive, which have been applicable since 1999, are now outdated.

(2) Under Directive 2005/32/EC ecodesign requirements should be set by the Commission for energy-using products representing significant volumes of sales and trade, having significant environmental impact and presenting significant potential for improvement in terms of their environmental impact without entailing excessive costs.

(3) Article 16(2), first indent, of Directive 2005/32/EC provides that, in accordance with the procedure referred to in Article 19(3) and the criteria set out in Article 15(2), and after consulting the Ecodesign Consultation Forum, the Commission shall, as appropriate, introduce a new implementing measure for household refrigerating appliances repealing Directive 96/57/EC.

(4) The Commission has carried out a preparatory study to analyse the technical, environmental and economic aspects of refrigerating appliances typically used in households. The study has been developed together with stakeholders and interested parties from the Community and third countries, and the results have been made publicly available on the Commission's website on EUROPA.

(5) The energy efficiency of absorption-type refrigerators and thermoelectric cooling refrigerating appliances, such as mini drink chillers, can be significantly improved. Those appliances should therefore be included in this Regulation.

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1 OJ L 191, 22.7.2005, p. 29.

2 OJ L 236, 18.9.1996, p. 36.

(6) The environmental aspects identified as significant for the purposes of this Regulation are energy consumption in the use phase and product features designed to ensure more environmentally friendly use of household refrigerating appliances by the end-user.

(7) The preparatory study shows that requirements regarding other ecodesign parameters referred to in Annex I, Part 1, of Directive 2005/32/EC are not necessary.

(8) The annual electricity consumption of products subject to this Regulation in the Community was estimated to have been 122 TWh in 2005, corresponding to 56 million tonnes of CO_2 equivalent. While the projected energy consumption of household refrigerating appliances will decrease by 2020, this reduction is expected to slow as a result of outdated requirements and energy labels. The cost-effective energy-savings potential would therefore not be achieved if no further measures are introduced to update the existing ecodesign requirements.

(9) The electricity consumption of products subject to this Regulation should be made more efficient by applying existing non-proprietary cost-effective technologies that reduce the combined cost of purchasing and operating these products.

(10) This Regulation should quickly ensure the placing on the market of more energy-efficient products subject to this Regulation.

(11) The ecodesign requirements should not affect functionality from the end-user's perspective and should not negatively affect health, safety or the environment. In particular, the benefits of reducing electricity consumption during the use phase should more than offset any additional environmental impacts during the production of products subject to this Regulation.

(12) The ecodesign requirements should be introduced gradually in order to provide a sufficient timeframe for manufacturers to re-design products subject to this Regulation as appropriate. The timing should be such as to avoid negative impacts on the functionalities of equipment on the market, and to take into account cost impacts for end-users and manufacturers, in particular small and medium-sized enterprises, while ensuring timely achievement of the objectives of this Regulation.

(13) Conformity assessment and measurements of the relevant product parameters should be performed using reliable, accurate and reproducible measurement methods, which take into account the generally recognised state of the art measurement methods including where available, harmonised standards adopted by the European standardisation bodies, as listed in Annex I to Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services[3]

(14) In accordance with Article 8 of Directive 2005/32/EC, this Regulation should specify the applicable conformity assessment procedures.

(15) In order to facilitate compliance checks, manufacturers should provide information in the technical documentation referred to in Annexes V and VI of Directive 2005/32/EC insofar as this information relates to the requirements laid down in this Regulation.

(16) In addition to the legally binding requirements laid down in this Regulation, indicative benchmarks for best available technologies should be identified to ensure the wide

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[3] OJ L 204, 21.7.1998, p. 37.

availability and accessibility of information on the life-cycle environmental performance of products subject to this Regulation.

(17) Directive 96/57/EC should therefore be repealed.

(18) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2005/32/EC,

HAS ADOPTED THIS REGULATION:

Article 1
Subject matter and scope

1. This Regulation establishes ecodesign requirements for the placing on the market of electric mains-operated household refrigerating appliances with a storage volume up to 1500 litres.

2. This Regulation shall apply to electric mains-operated household refrigerating appliances, including those sold for non-household use or for the refrigeration of items other than foodstuffs.

It shall also apply to electric mains-operated household refrigerating appliances that can be battery-operated.

3. This Regulation shall not apply to:

(a) refrigerating appliances that are primarily powered by energy sources other than electricity, such as liquefied petroleum gas (LPG), kerosene and bio-diesel fuels;

(b) battery-operated refrigerating appliances that can be connected to the mains through an AC/DC converter, purchased separately;

(c) custom-made refrigerating appliances, made on a one-off basis and not equivalent to other refrigerating appliance models;

(d) refrigerating appliances for tertiary sector application where the removal of refrigerated foodstuffs is electronically sensed and that information can be automatically transmitted through a network connection to a remote control system for accounting;

(e) appliances where the primary function is not the storage of foodstuffs through refrigeration, such as stand-alone ice-makers or chilled drinks dispensers.

Article 2
Definitions

In addition to the definitions set out in Directive 2005/32/EC, the following definitions shall apply:

(1) ‘foodstuffs’ means food, ingredients, beverages including wine, and other items primarily intended for consumption which require refrigeration at specified temperatures;

(2) ‘household refrigerating appliance’ means an insulated cabinet, with one or more compartments, intended for refrigerating or freezing foodstuffs, or for the storage of refrigerated or frozen foodstuffs for non-professional purposes, cooled by one or more energy-consuming processes including appliances sold as building kits to be assembled by the end-user;

(3) ‘refrigerator’ means a refrigerating appliance intended for the preservation of foodstuffs with at least one compartment suitable for the storage of fresh food and/or beverages, including wine;

(4) ‘compression-type refrigerating appliance’ means a refrigerating appliance in which refrigeration is effected by means of a motor-driven compressor;

(5) ‘absorption-type refrigerating appliance’ means a refrigerating appliance in which refrigeration is effected by an absorption process using heat as the energy source;

(6) ‘refrigerator-freezer’ means a refrigerating appliance with at least one fresh-food storage compartment and at least one other compartment suitable for the freezing of fresh food and the storage of frozen foodstuffs under three-star storage conditions (the food-freezer compartment);

(7) ‘frozen-food storage cabinet’ means a refrigerating appliance with one or more compartments suitable for the storage of frozen foodstuffs;

(8) ‘food freezer’ means a refrigerating appliance with one or more compartments suitable for freezing foodstuffs with temperatures ranging from ambient temperature down to -18 °C, and which is also suitable for the storage of frozen foodstuffs under three-star storage conditions; a food freezer may also include two-star sections and/or compartments within the compartment or cabinet;

(9) ‘wine storage appliance’ means a refrigerating appliance that has no compartment other than one or more wine storage compartments;

(10) ‘multi-use appliance’ means a refrigerating appliance that has no compartment other than one or more multi-use compartments;

(11) ‘equivalent refrigerating appliance’ means a model placed on the market with the same gross and storage volumes, same technical, efficiency and performance characteristics, and same compartment types as another refrigerating appliance model placed on the market under a different commercial code number by the same manufacturer.

Additional definitions for the purpose of Annexes II to VI are set out in Annex I.

Article 3

Ecodesign requirements

The generic ecodesign requirements for household refrigerating appliances within the scope of this Regulation are set out in Annex II, point 1. The specific ecodesign requirements for household refrigerating appliances within the scope of this Regulation are set out in Annex II, point 2.

Article 4

Conformity assessment

1. The conformity assessment procedure referred to in Article 8 of Directive 2005/32/EC shall be the internal design control system set out in Annex IV of that Directive or the management system set out in Annex V of that Directive.

2. For the purposes of conformity assessment pursuant to Article 8 of Directive 2005/32/EC, the technical documentation file shall contain a copy of the product information provided in accordance with Annex III, point 2, and the results of the calculations set out in Annex IV of this Regulation.

Where the information included in the technical documentation for a particular household refrigerating appliance model has been obtained by calculation on the basis of design, or extrapolation from other equivalent household refrigerating appliances, or both, the documentation shall include details of such calculations or extrapolations, or both, and of tests undertaken by manufacturers to verify the accuracy of the calculations undertaken. In such cases, the technical documentation shall also include a list of all other equivalent household refrigerating appliance models where the information included in the technical documentation was obtained on the same basis.

Article 5

Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Article 3(2) of Directive 2005/32/EC for the requirements set out in Annex II of this Regulation, the Member State authorities shall apply the verification procedure described in Annex V of this Regulation.

Article 6

Benchmarks

The indicative benchmarks for best-performing household refrigerating appliances available on the market at the time of entry into force of this Regulation are set out in Annex VI.

Article 7

Revision

The Commission shall review this Regulation in the light of technological progress no later than five years after its entry into force and present the result of this review to the Ecodesign Consultation Forum. The review shall in particular assess the verification tolerances of Annex V and the possibilities for removing or reducing the values of the correction factors of Annex IV.

The Commission shall assess the need to adopt specific ecodesign requirements for wine storage appliances no later than two years after the entry into force of this Regulation.

Article 8

Repeal

Directive 96/57/EC is repealed from 1 July 2010.

Article 9

Entry into force

1. This Regulation shall enter into force on the twentieth day following that of its publication in the Official Journal of the European Union.

2. The generic ecodesign requirements set out in point 1(1) of Annex II shall apply from 1 July 2010.

   The generic ecodesign requirements set out in point 1(2) of Annex II shall apply from 1 July 2013.

   The specific ecodesign requirements for the Energy Efficiency Index set out in point 2 of Annex II shall apply in accordance with the timetable set out in Tables 1 and 2 of Annex II.

3. This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, […]

For the Commission
Member of the Commission

LIST OF ANNEXES

ANNEX I
Definitions applicable for the purposes of Annexes II to VI

For the purpose of Annexes II to VI, the following definitions shall apply:

(a) 'other-type refrigerating appliances' means a refrigerating appliance in which refrigeration is effected by any other technology or process than compression or absorption-types;

(b) 'frost-free system' means a system automatically operated to prevent the permanent formation of frost, where cooling is provided by forced air circulation, the evaporator or evaporators are defrosted by an automatic defrost system, and the water from defrosting is disposed of automatically;

(c) 'frost-free compartment' means any compartment defrosted by a frost-free system;

(d) 'built-in appliance' means a fixed refrigerating appliance intended to be installed in a cabinet, in a prepared recess in a wall or similar location, and requiring furniture finishing;

(e) 'refrigerator-cellar' means a refrigerating appliance where at least one fresh-food storage compartment and one cellar compartment, but no frozen-food storage, chill or ice making compartments, are present;

(f) 'cellar' means a refrigerating appliance where only one or more cellar compartments are present;

(g) 'refrigerator-chiller' means a refrigerating appliance where at least a fresh-food storage compartment and a chill compartment, but no frozen-food storage compartments, are present;

(h) 'compartments' means any of the compartments listed in points (i) to (p);

(i) 'fresh-food storage compartment' means a compartment designed for the storage of unfrozen foodstuffs, which may itself be divided into sub-compartments;

(j) 'cellar compartment' means a compartment intended for the storage of particular foodstuffs or beverages at a temperature warmer than that of a fresh-food storage compartment;

(k) 'chill compartment' means a compartment intended specifically for the storage of highly perishable foodstuffs;

(l) 'ice-making compartment' means a low-temperature compartment intended specifically for the freezing and storage of ice;

(m) 'frozen-food storage compartment' means a low-temperature compartment intended specifically for the storage of frozen foodstuffs and classified according to temperature as follows:

  (i) 'one-star compartment': a frozen-food storage compartment in which the temperature is not warmer than -6 °C,

  (ii) 'two-star compartment': a frozen-food storage compartment in which the temperature is not warmer than -12 °C,

  (iii) 'three-star compartment': a frozen-food storage compartment in which the temperature is not warmer than -18 °C,

  (iv) 'food freezer compartment' (or 'four-star compartment'): a compartment suitable for freezing at least 4.5 kg of foodstuffs per 100 l of storage volume,

and in no case less than 2 kg, from ambient temperature down to -18 °C over a period of 24 hours, which is also suitable for the storage of frozen food under three-star storage conditions, and may include two-star sections within the compartment,

(v) '0-star compartment': a frozen-food storage compartment in which the temperature is <0 °C and which can also be used for the freezing and storage of ice but is not intended for the storage of highly perishable foodstuffs;

(n) 'wine storage compartment' means a compartment exclusively designed either for short-term wine storage to bring wines to the ideal drinking temperature or for long-term wine storage to allow wine to mature, with the following features:

(i) continuous storage temperature, either pre-set or set manually according to the manufacturer's instructions, in the range from +5 °C to +20 °C,

(ii) storage temperature(s) within a variation over time of less than 0.5 K at each declared ambient temperature specified by the climate class for household refrigerating appliances,

(iii) active or passive control of the compartment humidity in the range from 50 % to 80 %,

(iv) constructed to reduce the transmission of vibration to the compartment, whether from the refrigerator compressor or from any external source;

(o) 'multi-use compartment' means a compartment intended for use at two or more of the temperatures of the compartment types and capable of being set by the end-user to continuously maintain the operating temperature range applicable to each compartment type according to the manufacturer's instructions; however, where a feature can shift temperatures in a compartment to a different operating temperature range for a period of limited duration only (such as a fast-freeze facility) the compartment is not a 'multi-use compartment' as defined by this Regulation;

(p) 'other compartment' means a compartment, other than a wine storage compartment, intended for the storage of particular foodstuffs at a temperature warmer than +14 °C;

(q) 'two-star section' means part of a food-freezer, a food-freezer compartment, a three-star compartment or a three-star frozen-food storage cabinet which does not have its own individual access door or lid and in which the temperature is not warmer than -12 °C;

(r) 'chest freezer', means a food freezer in which the compartment(s) is accessible from the top of the appliance or which has both top-opening type and upright type compartments but where the gross volume of the top-opening type compartment(s) exceeds 75 % of the total gross volume of the appliance;

(s) 'top-opening type' or 'chest type' means a refrigerating appliance with its compartment(s) accessible from the top of the appliance;

(t) 'upright type' means a refrigerating appliance with its compartment(s) accessible from the front of the appliance;

(u) 'fast freeze' means a reversible feature to be activated by the end-user according to the manufacturer's instructions, which decreases the storage temperature of the freezer or freezer compartment to achieve a faster freezing of unfrozen foodstuffs;

ANNEX II
Ecodesign requirements for household refrigerating appliances

1. GENERIC ECODESIGN REQUIREMENTS

(1) From 1 July 2010:

(a) For wine storage appliances, the following information shall be displayed in the instruction booklet provided by manufacturers: '*This appliance is intended to be used exclusively for the storage of wine*'.

(b) For household refrigerating appliances, information shall be provided in the instruction booklet provided by manufacturers concerning:

– the combination of drawers, baskets and shelves that result in the most efficient use of energy for the appliance; and

– how to minimize the energy consumption of the household refrigerating appliance in the use-phase.

(2) From 1 July 2013:

(a) The fast freezing facility, or any similar function achieved through modification of the thermostat settings, in freezers and freezer compartments, shall, once activated by the end-user according to the manufacturer's instructions, automatically revert to the previous normal storage temperature conditions after no more than 72 hours. This requirement does not apply to refrigerator-freezers with one thermostat and one compressor which are equipped with an electromechanical control board.

(b) Refrigerator-freezers with one thermostat and one compressor which are equipped with an electronic control board and can be used in ambient temperatures below +16 °C according to the manufacturer's instructions shall be such that any winter setting switch or similar function guaranteeing the correct frozen-food storage temperature is automatically operated according to the ambient temperature where the appliance is installed.

(c) Household refrigerating appliances with a storage volume below 10 litres shall automatically enter in an operating condition with a power consumption of 0.00 Watt after no more than 1 hour when empty. The mere presence of a hard off switch shall not be considered sufficient to fulfil this requirement.

2. SPECIFIC ECODESIGN REQUIREMENTS

Household refrigerating appliances within the scope of this Regulation with a storage volume equal to or higher than 10 litres shall comply with the energy efficiency index limits in Tables 1 and 2.

The specific ecodesign requirements in Tables 1 and 2 shall not apply to:

– wine storage appliances; or

– absorption-type refrigerating appliances and Other-type refrigerating appliances belonging to Categories 4 to 9 as set out in Annex IV, Point 1.

The Energy Efficiency Index (*EEI*) of household refrigerating appliances is calculated in accordance with the procedure described in Annex IV.

Table 1: Compression-type refrigerating appliances

Application date	Energy Efficiency Index (*EEI*)
1 July 2010	*EEI* < 55
1 July 2012	*EEI* < 44
1 July 2014	*EEI* < 42

Table 2: Absorption-type and Other-type refrigerating appliances

Application date	Energy Efficiency Index (*EEI*)
1 July 2010	*EEI* < 150
1 July 2012	*EEI* < 125
1 July 2015	*EEI* < 110

ANNEX III
Measurements

For the purposes of compliance with the requirements of this Regulation, measurements shall be made using a reliable, accurate and reproducible measurement procedure that takes into account the generally recognised state of the art measurement methods, including methods set out in documents the reference numbers of which have been published for that purpose in the Official Journal of the European Union.

1. GENERAL CONDITIONS FOR TESTING

The following general conditions for testing apply:

(1) if anti-condensation heaters that can be switched on and off by the end-user are provided, they shall be switched on and — if adjustable — set at maximum heating;

(2) if 'through-the-door devices' (such as ice or chilled water/drinks dispensers) which can be switched on and off by the end-user are provided, they shall be switched on during the energy consumption measurement but not operated;

(3) for multi-use appliances and compartments, the storage temperature during the measurement of energy consumption shall be the nominal temperature of the coldest compartment type as claimed for continuous normal use according to the manufacturer's instructions;

(4) the energy consumption of a refrigerating appliance shall be determined in the coldest configuration, according to the manufacturer's instructions for continuous normal use for any 'other compartment' as defined in Annex IV, Table 5.

2. TECHNICAL PARAMETERS

The following parameters shall be established:

(a) 'overall dimensions', which are measured to the nearest millimetre;

(b) 'overall space required in use', which is measured to the nearest millimetre;

(c) 'total gross volumes(s)', which is measured to the nearest whole number of cubic decimetres or litres;

(d) 'storage volume(s) and total storage volume(s)', which is measured to the nearest whole number of cubic decimetres or of litres;

(e) 'defrosting type'

(f) 'storage temperature'

(g) 'energy consumption' which is expressed in kilowatt hours per 24 hours (kWh/24h), to three decimal places;

(h) 'temperature rise';

(i) 'freezing capacity';

(j) 'power consumption', which is measured in Watts rounded to two decimal places; and

(k) 'wine storage compartment humidity', which is expressed as a percentage rounded to the nearest integer.

ANNEX IV
Method for calculating the Energy Efficiency Index

1. CLASSIFICATION OF HOUSEHOLD REFRIGERATING APPLIANCES

Household refrigerating appliances are classified in categories as in Table 1. Each category is defined by the specific compartment composition as specified in Table 2 and is independent of the number of doors and/or drawers.

Table 1: Household refrigerating appliances categories

Category	Designation
1	Refrigerator with one or more fresh-food storage compartments
2	Refrigerator-cellar, Cellar and Wine storage appliances
3	Refrigerator-chiller and Refrigerator with a 0-star compartment
4	Refrigerator with a 1-star compartment
5	Refrigerator with a 2-star compartment
6	Refrigerator with a 3-star compartment
7	Refrigerator-freezer
8	Upright freezer
9	Chest freezer
10	Multi-use and other refrigerating appliances

Household refrigerating appliances that cannot be classified in categories 1 to 9 because of compartment temperature are classified in category 10.

Table 2: Household refrigerating appliance classification and relevant compartment composition

Nominal temperature (for the EEI) (°C)	Design T	+12	+12	+5	0	0	-6	-12	-18	-18	Category (number)
Compartment types	Other	Wine storage	Cellar	Fresh food storage	Chill	0star/ Ice making	1 star	2 star	3 star	4 star	
Appliance Category	Compartments composition										
REFRIGERATOR WITH ONE OR MORE FRESH-FOOD STORAGE COMPARTMENTS	N	N	N	Y	N	N	N	N	N	N	1
REFRIGERATOR-CELLAR, CELLAR and WINE STORAGE APPLIANCE	O	O	O	Y	N	N	N	N	N	N	2
	O	O	Y	N	N	N	N	N	N	N	
	N	Y	N	N	N	N	N	N	N	N	
REFRIGERATOR-CHILLER and REFRIGERATOR WITH A 0-STAR COMPARTMENT	O	O	O	Y	Y	O	N	N	N	N	3
	O	O	O	Y	O	Y	N	N	N	N	
REFRIGERATOR WITH A 1-STAR COMPARTMENT	O	O	O	Y	O	O	Y	N	N	N	4
REFRIGERATOR WITH A 2-STAR COMPARTMENT	O	O	O	Y	O	O	O	Y	N	N	5
REFRIGERATOR WITH A 3-STAR COMPARTMENT	O	O	O	Y	O	O	O	O	Y	N	6
REFRIGERATOR-FREEZER	O	O	O	Y	O	O	O	O	O	Y	7
UPRIGHT FREEZER	N	N	N	N	N	N	N	O	(Y)[a]	Y	8
CHEST FREEZER	N	N	N	N	N	N	N	O	N	Y	9
MULTI-USE AND OTHER APPLIANCES	O	O	O	O	O	O	O	O	O	O	10

Notes:
Y = the compartment is present; N = the compartment is not present; O = the presence of the compartment is optional;
a) also includes 3-star frozen-food cabinets.

Household refrigerating appliances are classified in one or more climate classes as shown in Table 3

Table 3: Climate classes

Class	Symbol	Ambient average temperature °C
Extended temperate	SN	+ 10 to +32
Temperate	N	+16 to +32
Subtropical	ST	+16 to +38
Tropical	T	+16 to +43

The refrigerating appliance shall be capable of maintaining the required storage temperatures in the different compartments simultaneously and within the permitted temperature deviations (during the defrost cycle) as defined in Table 4 for the different types of household refrigerating appliances and for the appropriate climate classes.

Multi-use appliances and/or compartments shall be capable of maintaining the required storage temperatures of the different compartment types where these temperatures can be set by the end-user according to the manufacturer's instructions.

Table 4: Storage temperatures

Storage temperatures (°C)							
Other compartment t_{om}	Wine storage compartment t_{wma}	Cellar compartment t_{cm}	Fresh-food storage compartment t_{1m}, t_{2m}, t_{3m}, t_{ma}	Chill compartment t_{cc}	One-star compartment t*	Two-star compartment/ section t**	Food freezer and three-star compartment /cabinet t***
>+14	+5≤ twma≤+20	+8≤t_{cm} ≤+14	0≤t_{1m}, t_{2m}, t_{3m}≤ +8; t_{ma}≤+4	-2 ≤ t_{cc} ≤+3	≤ -6	≤ -12 [a]	≤ -18 [a]

Notes:
– t_{om}: storage temperature of the other compartment
– t_{wma}: storage temperature of the wine storage compartment with a variation of 0.5K
– t_{cm}: storage temperature of the cellar compartment
–t_{1m}, t_{2m}, t_{3m}: storage temperatures of the fresh-food compartment
– t_{ma}: average storage temperature of the fresh-food compartment
– t_{cc}: instantaneous storage temperature of the chill compartment
– t*, t**, t***: maximum temperatures of the frozen-food storage compartments
– storage temperature for the ice-making compartment and for the '0 star' compartment is below 0 °C
[a)] for frost-free household refrigerating appliances during the defrost cycle, a temperature deviation of no more than 3 K during a period of 4 hours or 20 % of the duration of the operating cycle, whichever is the shorter, is allowed

2. CALCULATION OF THE EQUIVALENT VOLUME

The equivalent volume of a household refrigerating appliance is the sum of the equivalent volumes of all compartments. It is calculated in litres and rounded to the nearest integer as:

$$V_{eq} = \left[\sum_{c=1}^{c=n} V_c \times \frac{(25 - T_c)}{20} \times FF_c \right] \times CC \times BI$$

where:

– n is the number of compartments

– V_c is the storage volume of the compartment(s)

– T_c is the nominal temperature of the compartment(s) as set out in Table 2

– $\frac{(25-T_c)}{20}$ is the thermodynamic factor as set in Table 5

– FF_c, CC and BI are volume correction factors as set out in Table 6

The thermodynamic correction factor $\frac{(25-T_c)}{20}$ is the temperature difference between the nominal temperature of a compartment T_c (defined in Table 2) and the ambient temperature under standard test conditions at +25 °C, expressed as a ratio of the same difference for a fresh-food compartment at +5 °C.

The thermodynamic factors for the compartments described in Annex I, points (i) to (p), are set out in Table 5.

Table 5: Thermodynamic factors for refrigerating appliance compartments

Compartment	Nominal temperature	$(25-T_c)/20$
Other compartment	Design temperature	$\frac{(25-T_c)}{20}$
Cellar compartment / Wine storage compartment	+12 °C	0.65
Fresh-food storage compartment	+5 °C	1.00
Chill compartment	0 °C	1.25
Ice-making compartment and 0-star compartment	0 °C	1.25
One-star compartment	-6 °C	1.55
Two-star compartment	-12 °C	1.85
Three-star compartment	-18 °C	2.15
Food freezer compartment (four-star compartment)	-18 °C	2.15

Notes:

(i) for multi-use compartments, the thermodynamic factor is determined by the nominal temperature as given in Table 2 of the coldest compartment type capable of being set by the end-user and maintained continuously according to the manufacturer's instructions;

(ii) for any two-star section (within a freezer) the thermodynamic factor is determined at T_c = -12 °C;

(iii) for other compartments the thermodynamic factor is determined by the coldest design temperature capable of being set by the end-user and maintained continuously according to the manufacturer's instructions.

Table 6: Value of the correction factors

Correction factor	Value	Conditions
FF (Frost-free)	1.2	For frost-free frozen-food storage compartments
	1	Otherwise
CC (climate class)	1.2	For T class (tropical) appliances

	1.1	For ST class (subtropical) appliances
	1	Otherwise
BI (built-in)	1.2	For built-in appliances under 58 cm in width
	1	Otherwise

Notes:

(i) *FF* is the volume correction factor for frost-free compartments.

(ii) *CC* is the volume correction factor for a given climate class. If a refrigerating appliance is classified in more than one climate class, the climate class with the highest correction factor is used for the calculation of the equivalent volume.

(iii) *BI* is the volume correction factor for built-in appliances.

3. CALCULATION OF THE ENERGY EFFICIENCY INDEX

For the calculation of the Energy Efficiency Index (*EEI*), of a household refrigerating appliance model, the Annual Energy Consumption of the household refrigerating appliance is compared to its Standard Annual Energy Consumption.

(1) The Energy Efficiency Index (*EEI*) is calculated and rounded to the first decimal place, as:

$$EEI = \frac{AE_C}{SAE_C} \times 100$$

where:

– AE_C = Annual Energy Consumption of the household refrigerating appliance

– SAE_C = Standard Annual Energy Consumption of the household refrigerating appliance.

(2) The Annual Energy Consumption (AE_C) is calculated in kWh/year and rounded to two decimal places, as:

$$AE_C = E_{24h} \times 365$$

where:

– E_{24h} is the energy consumption of the household refrigerating appliance in kWh/24h and rounded to three decimal places.

(3) The Standard Annual Energy Consumption (SAE_C) is calculated in kWh/year and rounded to two decimal places, as:

$$SAE_C = V_{eq} \times M + N + CH$$

where:

– V_{eq} is the equivalent volume of the household refrigerating appliance

– *CH* is equal to 50 kWh/year for household refrigerating appliances with a chill compartment with a storage volume of at least 15 litres

– the *M* and *N* values are given in Table 7 for each household refrigerating appliance category

Table 7: *M* and *N* values by household refrigerating appliance category

Category	M	N
1	0.233	245
2	0.233	245
3	0.233	245
4	0.643	191
5	0.450	245
6	0.777	303
7	0.777	303
8	0.539	315
9	0.472	286
10	*	*

Note:

* for Category 10 household refrigerating appliances the *M* and *N* values depend on the temperature and star rating of the compartment with the lowest storage temperature capable of being set by the end-user and maintained continuously according to the manufacturer's instructions. When only an 'other compartment' as defined in Table 2 and Annex I, point (p), is present, the *M* and *N* values for Category 1 are used. Appliances with three-star compartments or food-freezer compartments are considered to be refrigerator-freezers.

ANNEX V
Verification procedure for market surveillance purposes

For the purposes of checking conformity with the requirements laid down in Annex II, Member State authorities shall test a single household refrigerating appliance. If the measured parameters do not meet the values declared by the manufacturer, in accordance with Article 4(2), within the range defined in Table 1, the measurements shall be carried out on three additional household refrigerating appliances. The arithmetic mean of the measured values of these three additional household refrigerating appliances shall meet the requirements laid down in Annex II within the range defined in Table 1.

Otherwise, the model and all other equivalent household refrigerating appliance models shall be considered not to comply.

Table 1

Measured parameter	Verification tolerances
Rated gross volume	The measured value shall not be less than the rated value* by more than 3 % or 1 l, whichever is the greater value.
Rated storage volume	The measured value shall not be less than the rated value by more than 3 % or 1 l, whichever is the greater value. Where the volumes of the cellar compartment and fresh food storage compartment are adjustable, relative to one another by the user, this measurement uncertainty applies when the cellar compartment is adjusted to its minimum volume.
Freezing capacity	The measured value shall not be less than the rated value by more than 10 %.
Energy consumption	The measured value shall not be greater than the rated value (E_{24h}) by more than 10 %.
Power consumption of household refrigerating appliances with a storage volume below 10 litres	The measured value shall not be greater than the limit value laid down in Annex II, point 1(2c), by more than 0.10 W at the 95 % confidence level.
Wine storage appliances	The value measured for the relative humidity shall not exceed the nominal range by more than 10 %.

* "rated value" means a value that is declared by the manufacturer

In addition to the procedure set out in Annex III, Member States authorities shall use reliable, accurate and reproducible measurement procedures, which take into account the generally recognised state of the art, including methods set out in documents the reference numbers of which have been published for that purpose in the Official Journal of the European Union.

ANNEX VI
Indicative benchmarks for household refrigerating appliances

At the time of entry into force of this Regulation, the best available technology on the market for household refrigerating appliances in terms of their Energy Efficiency Index (*EEI*) and noise was identified as follows.

Refrigerators, compression-type:

- *EEI* = 29.7 and an annual energy consumption of 115 kWh/year for a total storage volume of 300 litres in a fresh-food compartment plus a 25-litres chill compartment, and T (tropical) climate class;
- Noise: 33 dB(A).

Refrigerators, absorption-type:

- *EEI* = 97.2 and an annual energy consumption of 245 kWh/year for a total storage volume of 28 litres in a fresh-food compartment, and N (temperate) climatic class;
- Noise ≈ 0 dB(A).

Refrigerator-freezers, compression-type:

- *EEI* = 28.0 and an annual energy consumption of 157 kWh/year for a total storage volume of 255 litres, of which 236 litres in a fresh-food compartment and 19 litres in a four-star freezer compartment, and T (tropical) climate class;
- Noise = 33 dB(A).

Upright freezers, compression-type:

- *EEI* = 29.3 and an annual energy consumption of 172 kWh/year for a total storage volume of 195 litres in a four-star freezer compartment, and T (tropical) climate class;
- Noise = 35 dB(A).

Chest freezers, compression-type:

- *EEI* = 27.4 and an annual energy consumption of 153 kWh/year for a total storage volume of 223 litres in a four-star freezer compartment, and T (tropical) climate class;
- Noise =37 dB(A).