

COMMISSION REGULATION (EU) 2019/2019**of 1 October 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****(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

Having regard to Article 114 of the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products ⁽¹⁾, and in particular Article 15(1) thereof,

Whereas:

- (1) Pursuant to Directive 2009/125/EC the Commission should set ecodesign requirements for energy-related products which account for significant volumes of sales and trade in the Union and which have a significant environmental impact and presenting significant potential for improvement through design in terms of their environmental impact, without entailing excessive costs.
- (2) The Communication from the Commission COM(2016) 773 ⁽²⁾ (ecodesign working plan) established by the Commission in application of Article 16(1) of Directive 2009/125/EC sets out the working priorities under the ecodesign and energy labelling framework for the period 2016-2019. The ecodesign working plan identifies the energy-related product groups to be considered as priorities for the undertaking of preparatory studies and eventual adoption of implementing measures, as well as the review of Commission Regulation (EC) No 643/2009 ⁽³⁾ and Commission Delegated Regulation (EU) No 1060/2010 ⁽⁴⁾.
- (3) Measures from the ecodesign working plan have an estimated potential to deliver a total in excess of 260 TWh of annual final energy savings in 2030, which is equivalent to reducing greenhouse gas emissions by approximately 100 million tonnes per year in 2030. Refrigerating appliances is one of the product groups listed in the ecodesign working plan, with an estimated 10 TWh of annual final energy savings in 2030.
- (4) The Commission established ecodesign requirements for household refrigerating appliances in Regulation (EC) No 643/2009 and pursuant to that Regulation, the Commission should regularly review the Regulation in the light of technological progress.
- (5) The Commission has reviewed Regulation (EC) No 643/2009 and analysed the technical, environmental and economic aspects of refrigerating appliances as well as real-life user behaviour. The review was carried out in close cooperation with stakeholders and interested parties from the Union and third countries. The results of the review were made public and presented to the Consultation Forum established by Article 18 of Directive 2009/125/EC.
- (6) The review shows the benefit of continued and improved requirements, adapted to the technological progress of refrigerating appliances. Specifically, it shows that energy efficiency requirements for wine storage appliances can be introduced and that correction factors can be eliminated or significantly reduced.
- (7) The annual energy consumption of products subject to this Regulation in the Union was estimated at 86 TWh in 2015, corresponding to 34 million tonnes of CO₂ equivalent greenhouse gas emissions. The energy consumption of refrigerating appliances in a business-as-usual scenario is projected to decrease by 2030. However, this decrease is expected to slow down unless the existing ecodesign requirements are updated.

⁽¹⁾ OJ L 285, 31.10.2009, p. 10.

⁽²⁾ Communication from the Commission. Ecodesign working plan 2016-2019, COM(2016) 773 final, 30.11.2016.

⁽³⁾ Commission Regulation (EC) No 643/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for household refrigerating appliances (OJ L 191, 23.7.2009, p. 53).

⁽⁴⁾ Commission Delegated Regulation (EU) No 1060/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household refrigerating appliances (OJ L 314, 30.11.2010, p. 17).

- (8) The environmental aspects of the refrigerating appliances in the scope of this Regulation that have been identified as significant for the purposes of this Regulation are energy consumption in the use phase, increased energy use over the product life due to leaking door gaskets, poor reparability and suboptimal food preservation options resulting in avoidable food waste.
- (9) The Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2015) 614 final ⁽⁵⁾ (circular economy action plan) and the ecodesign working plan underline the importance of using the ecodesign framework to support the move towards a more resource efficient and circular economy. Directive 2012/19/EU of the European Parliament and of the Council ⁽⁶⁾ refers to Directive 2009/125/EC and indicates that ecodesign requirements should facilitate the re-use, dismantling and recovery of waste electrical and electronic equipment (WEEE) by tackling the issues upstream. This Regulation should therefore lay down appropriate requirements for this.
- (10) Refrigerating appliances with a direct sales function should be subject to a separate ecodesign regulation.
- (11) Chest freezers, including professional chest freezers, should be in the scope of this Regulation, as they are out of the scope of the Commission Regulation (EU) 2015/1095 ⁽⁷⁾ and can be used in other environments than professional environments.
- (12) Wine storage appliances and low noise refrigerating appliances (such as minibars), including those with transparent doors, do not have a direct sales function. Wine storage appliances are usually either used in household environments or in restaurants, whereas minibars are usually used in hotel rooms. Therefore, wine storage appliances and minibars, including those with transparent doors should be covered by this Regulation.
- (13) The relevant product parameters should be measured using reliable, accurate and reproducible methods. Those methods should take into account recognised state-of-the-art measurement methods including, where available, harmonised standards adopted by the European standardisation bodies, as listed in Annex I to Regulation (EU) No 1025/2012 of the European Parliament and of the Council ⁽⁸⁾.
- (14) In accordance with Article 8 of Directive 2009/125/EC, this Regulation should specify the applicable conformity assessment procedures.
- (15) To facilitate compliance checks, manufacturers, importers or authorised representatives should provide information in the technical documentation referred to in Annexes IV and V to Directive 2009/125/EC in so far as that information relates to the requirements laid down in this Regulation.
- (16) For market surveillance purposes, manufacturers, importers or authorised representatives should be allowed to refer to the product database if the technical documentation as per Commission Delegated Regulation (EU) 2019/2016 ⁽⁹⁾ contains the same information.
- (17) To improve the effectiveness of this Regulation and to protect consumers, products that automatically alter their performance in test conditions to improve the declared parameters should be prohibited.
- (18) In addition to the legally binding requirements laid down in this Regulation, indicative benchmarks for best available technologies should be identified to make information on the products' environmental performance over their life cycle subject to this Regulation widely available and easily accessible, in accordance with Directive 2009/125/EC, Annex I, part 3, point (2).

⁽⁵⁾ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Closing the loop — An EU action plan for the circular economy, COM(2015) 614 final, 2.12.2015.

⁽⁶⁾ Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (OJ L 197, 24.7.2012, p. 38).

⁽⁷⁾ Commission Regulation (EU) 2015/1095 of 5 May 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers (OJ L 177, 8.7.2015, p. 19).

⁽⁸⁾ Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council (OJ L 316, 14.11.2012, p. 12).

⁽⁹⁾ Commission Delegated Regulation (EU) 2019/2016 of 11 March 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 (see page 102 of this Official Journal).

- (19) A review of this Regulation should assess the appropriateness and effectiveness of its provisions in achieving its goals. The timing of the review should allow for all provisions to be implemented and show an effect on the market.
- (20) Regulation (EC) No 643/2009 should therefore be repealed.
- (21) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2009/125/EC,

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter and scope

1. This Regulation establishes ecodesign requirements for the placing on the market of or the putting into service of electric mains-operated refrigerating appliances with a total volume of more than 10 litres and less than or equal to 1 500 litres.
2. This Regulation does not apply to:
 - (a) professional refrigerated storage cabinets and blast cabinets, with the exception of professional chest freezers;
 - (b) refrigerating appliances with a direct sales function;
 - (c) mobile refrigerating appliances;
 - (d) appliances where the primary function is not the storage of foodstuffs through refrigeration.

Article 2

Definitions

For the purpose of this Regulation, the following definitions shall apply:

- (1) 'mains' or 'electric mains' means the electricity supply from the grid of 230 ($\pm 10\%$) volt of alternating current at 50 Hz;
- (2) 'refrigerating appliance' means an insulated cabinet with one or more compartments that are controlled at specific temperatures, cooled by natural or forced convection whereby the cooling is obtained by one or more energy consuming means;
- (3) 'compartment' means an enclosed space within a refrigerating appliance, separated from other compartment(s) by a partition, container, or similar construction, which is directly accessible through one or more external doors and may itself be divided into sub-compartments. For the purpose of this Regulation, unless specified otherwise, compartment refers to both compartments and sub-compartments;
- (4) 'external door' is the part of a cabinet that can be moved or removed to at least allow the load to be moved from the exterior to the interior or from the interior to the exterior of the cabinet;
- (5) 'sub-compartment' means an enclosed space in a compartment having a different operating temperature range from the compartment in which it is located;
- (6) 'total volume' (V) means the volume of the space within the inside liner of the refrigerating appliance, equal to the sum of the compartment volumes, expressed in dm³ or litres;
- (7) 'compartment volume' (V_c) means the volume of the space within the inside liner of the compartment, expressed in dm³ or litres;
- (8) 'professional refrigerated storage cabinet' means an insulated refrigerating appliance integrating one or more compartments accessible via one or more doors or drawers, capable of continuously maintaining the temperature of foodstuffs within prescribed limits at chilled or frozen operating temperature, using a vapour compression cycle, and used for the storage of foodstuffs in non-household environments but not for the display to or access by customers, as defined in Regulation (EU) 2015/1095;

- (9) 'blast cabinet' means an insulated refrigerating appliance primarily intended to rapidly cool hot foodstuffs to below 10 °C in the case of chilling and below - 18 °C in the case of freezing, as defined in Regulation (EU) 2015/1095;
- (10) 'professional chest freezer' means a 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, used for the storage of foodstuffs in non-household environments;
- (11) 'freezer' means a refrigerating appliance with only 4-star compartments;
- (12) 'frozen compartment' means a compartment type with a target temperature equal to or below 0 °C; that is a 0-star, 1-star, 2-star, 3-star or 4-star compartment, as set out in Annex III, Table 3;
- (13) 'compartment type' means the declared compartment type in accordance with the refrigerating performance parameters T_{min} , T_{max} , T_c and others set out in Annex III, Table 3;
- (14) 'minimum temperature' (T_{min}) means the minimum temperature inside a compartment during storage testing, as set out in Annex III, Table 3;
- (15) 'maximum temperature' (T_{max}) means the maximum temperature inside a compartment during storage testing, as set out in Annex III, Table 3;
- (16) 'target temperature' (T_c) means the reference temperature inside a compartment during testing, as set out in Annex III, Table 3, and is the temperature for testing energy consumption expressed as the average over time and over a set of sensors;
- (17) '0-star compartment' and 'ice-making compartment' means a frozen compartment with a target temperature and storage conditions of 0 °C, as set out in Annex III, Table 3;
- (18) '1-star compartment' means a frozen compartment with a target temperature and storage conditions of - 6 °C, as set out in Annex III, Table 3;
- (19) '2-star compartment' means a frozen compartment with a target temperature and storage conditions of - 12 °C, as set out in Annex III, Table 3;
- (20) '3-star compartment' means a frozen compartment with a target temperature and storage conditions of - 18 °C, as set out in Annex III, Table 3;
- (21) 'freezer compartment' or '4-star compartment' means a frozen compartment with a target temperature and storage conditions of - 18 °C and which fulfils the requirements for the freezing capacity;
- (22) 'freezing capacity' means the amount of fresh foodstuffs that can be frozen in a freezer compartment in 24 h; it shall not be lower than 4,5 kg per 24 h per 100 litres of volume of the freezer compartment, with a minimum of 2,0 kg/24 h;
- (23) 'refrigerating appliance with a direct sales function' means a refrigerating appliance used for the functions of displaying and selling items at specified temperatures below the ambient temperature to customers, accessible directly through open sides or via one or more doors or drawers, or both, including also cabinets with areas used for storage or assisted serving of items not accessible by the customers and excluding minibars and wine storage appliances, as defined in Commission Regulation (EU) 2019/2024 ⁽¹⁰⁾;
- (24) 'minibar' means a refrigerating appliance with a total volume of maximum 60 litres, which is primary intended for the storage and sales of foodstuffs in hotel rooms and similar premises;

⁽¹⁰⁾ Commission Regulation (EU) 2019/2024 of 1 October 2019 laying down ecodesign requirements for refrigerating appliances with a direct sales function pursuant to Directive 2009/125/EC of the European Parliament and of the Council (see page 313 of this Official Journal).

- (25) 'wine storage appliance' means a dedicated refrigerating appliance for the storage of wine, with precision temperature control for the storage conditions and target temperature of a wine storage compartment, as defined in Annex III, Table 3, and equipped with anti-vibration measures;
- (26) 'dedicated refrigerating appliance' means a refrigerating appliance with only one type of compartment;
- (27) 'wine storage compartment' means an unfrozen compartment with a target temperature of 12 °C, an internal humidity range from 50 % to 80 % and storage conditions ranging from 5 °C to 20 °C, as defined in Annex III, Table 3;
- (28) 'mobile refrigerating appliance' means a refrigerating appliance that can be used where there is no access to the mains electricity grid and that uses extra low-voltage electricity (< 120V DC) or fuel or both as the energy source for the refrigeration functionality, including a refrigerating appliance that, in addition to extra low voltage electricity or fuel, or both, can be electric mains operated. An appliance placed on the market with an AC/DC converter is not a mobile refrigerating appliance;
- (29) 'foodstuffs' means food, ingredients, beverages, including wine, and other items primarily used for consumption which require refrigeration at specified temperatures;
- (30) 'energy efficiency index' (EEL) means an index number for the relative energy efficiency of a refrigeration appliance expressed in percentage, as set out in point 5 of Annex III;
- (31) 'low noise refrigerating appliance' means a 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);
- (32) 'airborne acoustical noise emission' means the sound power level of a refrigerating appliance, expressed in A-weighted decibel referred to 1 pico watt (dB(A) re 1 pW);
- (33) 'combi appliance' means a refrigerating appliance that has more than one compartment type of which at least one is an unfrozen compartment;
- (34) 'unfrozen compartment' means a compartment type with a target temperature equal to or above 4 °C; that is a pantry, wine storage, cellar or fresh food compartment with storage conditions and target temperatures, as set out in Annex III, Table 3;
- (35) 'pantry compartment' means an unfrozen compartment with a target temperature of 17 °C and storage conditions ranging from 14 °C to 20 °C, as set out in Annex III, Table 3;
- (36) 'cellar compartment' means an unfrozen compartment with a target temperature of 12 °C and storage conditions ranging from 2 °C to 14 °C, as set out in Annex III, Table 3;
- (37) 'fresh food compartment' means an unfrozen compartment with a target temperature of 4 °C and storage conditions ranging from 0 °C and 8 °C, as set out in Annex III, Table 3;
- (38) 'ambient controlled anti-condensation heater' means an anti-condensation heater where the heating capacity depends on either the ambient temperature or the ambient humidity or both;
- (39) 'anti-condensation heater' means a heater which prevents condensation on the refrigeration appliance;
- (40) 'auxiliary energy' (E_{aux}) means the energy used by an ambient controlled anti-condensation heater, expressed in kWh/a.

For the purposes of the Annexes, additional definitions are set out in Annex I.

Article 3

Ecodesign requirements

The ecodesign requirements set out in Annex II shall apply from the dates indicated therein.

*Article 4***Conformity assessment**

1. The conformity assessment procedure referred to in Article 8 of Directive 2009/125/EC shall be the internal design control system set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.
2. For the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC, the technical documentation shall contain a copy of the product information provided in accordance with point 4 of Annex II, and the details and the results of the calculations set out in Annex III to this Regulation.
3. Where the information included in the technical documentation for a particular model has been obtained:
 - (a) from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer, or
 - (b) by calculation on the basis of design or extrapolation from another model of the same or a different manufacturer, or both,

the technical documentation shall include the details of such calculation, the assessment undertaken by the manufacturer to verify the accuracy of the calculation and, where appropriate, the declaration of identity between the models of different manufacturers.

The technical documentation shall include a list of all equivalent models, including the model identifiers.

4. The technical documentation shall include the information in the order and as set out in Annex VI of Regulation (EU) 2019/2016. For market surveillance purposes, manufacturers, importers or authorised representatives may, without prejudice to Annex IV, point 2(g) of Directive 2009/125/EC, refer to the technical documentation uploaded to the product database which contains the same information laid down in Regulation (EU) 2019/2016.

*Article 5***Verification procedure for market surveillance purposes**

Member States shall apply the verification procedure laid down in Annex IV when performing the market surveillance checks referred to in point 2 of Article 3 of Directive 2009/125/EC.

*Article 6***Circumvention**

The manufacturer, importer or authorised representative shall not place on the market products designed to be able to detect they are being tested (e.g. by recognising the test conditions or test cycle), and to react specifically by automatically altering their performance during the test with the aim of reaching a more favourable level for any of the parameters declared by the manufacturer, importer or authorised representative in the technical documentation or included in any of the documentation provided.

The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user prior to update.

*Article 7***Indicative benchmarks**

The indicative benchmarks for the best-performing products and technologies available on the market at the time of adopting this Regulation are set out in Annex V.

*Article 8***Review**

The Commission shall review this Regulation in the light of technological progress and present the results of this assessment, including, if appropriate, a draft revision proposal, to the Consultation Forum by 25 December 2025.

This review shall in particular assess:

- (a) the energy efficiency index requirements for low noise refrigerating appliances and for wine storage appliances, including those with transparent doors;
- (b) the appropriateness to set energy efficiency index requirements for low noise combi appliances with frozen compartment(s);
- (c) the treatment of professional chest freezers;
- (d) the level of the tolerances;
- (e) the appropriateness of a mandatory sound signal for long door openings;
- (f) the compensation factors and the modelling parameters;
- (g) the appropriateness to set additional resource efficiency requirements for products in accordance with the principles of the circular economy, including whether more spare parts should be included;
- (h) the appropriateness of including other auxiliary devices or functions than the ambient controlled anti-condensation heater in the determination of the auxiliary energy;
- (i) the methodology for taking automatic and intelligent defrosting into account.

Article 9

Repeal

Commission Regulation (EC) No 643/2009 shall be repealed with effect from 1 March 2021.

Article 10

Entry into force and application

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

It shall apply from 1 March 2021. However, Article 6 shall apply from 25 December 2019.

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

Done at Brussels, 1 October 2019.

For the Commission

The President

Jean-Claude JUNCKER

ANNEX I

Definitions applicable for the Annexes

The following definitions shall apply:

- (1) 'transparent door(s)' means external door(s) made of a transparent material that allows the end-user to see items through it, at least 75 % of the internal cabinet height and 75 % of the internal cabinet width shall be transparent, both measured at the front of the cabinet;
- (2) 'fast freeze' means a feature that can be activated by the end-user according to the manufacturer's, the importer's or authorised representative's instructions, which decreases the storage temperature of freezer compartment(s) to achieve a faster freezing of unfrozen foodstuffs;
- (3) 'winter setting' means a control feature for a combi appliance with one compressor and one thermostat, which according to the manufacturer's, importer's or authorised representative's instructions can be used in ambient temperatures below +16 °C, consisting of a switching device or function that guarantees, even if it would not be required for the compartment where the thermostat is located, that the compressor keeps on working to maintain the proper storage temperatures in the other compartments;
- (4) 'chill compartment' means a compartment which is able to control its average temperature within a certain range without user-adjustments of its control, with a target temperature equal to 2 °C and storage conditions ranging from - 3 °C to 3 °C, as set out in Annex III, Table 3;
- (5) '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;
- (6) '2-star section' means part of a 3-star or 4-star compartment which does not have its own individual access door or lid and with a target temperature and storage conditions of - 12 °C;
- (7) 'door gasket' means a mechanical seal which fills the space between the door and the cabinet of the refrigerating appliance to prevent leakage from the cabinet to the outdoor air;
- (8) 'spare part' means a separate part that can replace a part with the same or similar function in a product;
- (9) 'professional repairer' means an operator or undertaking which provides services of repair and professional maintenance of refrigerating appliances;
- (10) 'freestanding appliance' means a refrigerating appliance that is not a built-in appliance;
- (11) 'built-in appliance' means a refrigerating appliance that is designed, tested and marketed exclusively:
 - (a) to be installed in cabinetry or encased (top, bottom and sides) by panels; and
 - (b) to be securely fastened to the sides, top or floor of the cabinetry or panels; and
 - (c) to be equipped with an integral factory-finished face or to be fitted with a custom front panel;
- (12) 'guarantee' means any undertaking by the retailer or a manufacturer, importer or authorised representative to the consumer to:
 - (a) reimburse the price paid; or
 - (b) replace, repair or handle refrigerating appliances in any way if they do not meet the specifications set out in the guarantee statement or in the relevant advertising;
- (13) 'climate class' means the range of ambient temperatures, as set out in point 1(i) of Annex III, in which the refrigerating appliances are intended to be used, and for which the required storage temperatures specified in Annex III, Table 3 are met simultaneously in all compartment(s);

- (14) 'product database' means a collection of data concerning 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 laid down in Regulation (EU) 2017/1369 of the European Parliament and of the Council ⁽¹⁾;
- (15) 'annual energy consumption' (AE) means the average daily energy consumption multiplied by 365 (days per year), expressed in kilowatt hour per year (kWh/a), as calculated in accordance with point 3 of Annex III;
- (16) 'daily energy consumption' (E_{daily}) means the electricity used by a refrigerating appliance over 24 hours at reference conditions, expressed in kilowatt hour per 24 hours (kWh/24 h), as calculated in accordance with point 3 of Annex III;
- (17) 'dispenser' means a device that dispenses chilled or frozen load on demand from a refrigerating appliance, such as ice-cube dispensers or chilled water dispensers;
- (18) 'variable temperature compartment' means a compartment intended for use as two (or more) alternative compartment types (for example a compartment that can be either a fresh food compartment or freezer compartment) and which is capable of being set by a user to continuously maintain the operating temperature range applicable for each declared compartment type. A compartment intended for use as a single compartment type that can also meet storage conditions of other compartment types (for example a chill compartment that may also fulfil 0-star requirements) is not a variable temperature compartment;
- (19) 'network' means a communication infrastructure with a topology of links, an architecture, including the physical components, organisational principles, communication procedures and formats (protocols);
- (20) 'steady-state power consumption' (P_{ss}) means the average power consumption in steady-state conditions, expressed in watt (W);
- (21) 'incremental defrost and recovery energy consumption' ($\Delta E_{\text{d-r}}$) means the extra average energy consumption for a defrost and recovery operation, expressed in watt hour (Wh);
- (22) 'auto-defrost' means a feature by which compartments are defrosted without user intervention to initiate the removal of frost accumulation at all temperature-control settings or to restore normal operation, and the disposal of the defrosted water is automatic;
- (23) 'defrost interval' ($t_{\text{d-r}}$) means the representative average interval, expressed in hour (h), between one time of activation of the defrost heater and the next in two subsequent defrost and recovery cycles; or if there is no defrost heater one time of deactivation of the compressor and the next in two subsequent defrost and recovery cycles;
- (24) 'defrost and recovery period' means the period from the initiation of a defrost control cycle until stable operating conditions are re-established;
- (25) 'defrosting type' means the method to remove frost accumulation on the evaporator(s) of a refrigerating appliance; that is auto-defrost or manual defrost;
- (26) 'manual defrost' means not having an auto-defrost function;
- (27) 'load factor' (L) means a factor accounting for the extra (beyond what is already anticipated through the higher average ambient temperature for testing) cooling load from introducing warm foodstuffs, with values as set out in point 3(a) of Annex III;
- (28) 'standard annual energy consumption' (SAE) means the reference annual energy consumption of a refrigerating appliance, expressed in kilowatt hour per year (kWh/a), as calculated in accordance with point 4 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).

- (29) 'combi parameter' (C) means a modelling parameter that takes into account the synergy effect when different compartment types are combined in one appliance, with values as set out in Annex III, Table 4;
- (30) 'door heat loss factor' (D) means a compensation factor for combi appliances according to the number of different temperature compartments or the number of external doors, whichever is lower and as set out in Annex III, Table 5. For this factor, 'compartment' does not refer to sub-compartment;
- (31) 'defrost factor' (A_d) means a compensation factor that takes into account whether the refrigerating appliance has an auto-defrost or a manual defrost, with values as set out in Annex III, Table 5;
- (32) 'built-in factor' (B_c) means a compensation factor that takes into account whether the refrigerating appliance is built-in or freestanding, with values as set out in Annex III, Table 5;
- (33) ' M_c ' and ' N_c ' means modelling parameters that take into account the volume-dependence of the energy use, with values as set out in Annex III, Table 4;
- (34) 'thermodynamic parameter' (r_c) means a modelling parameter which corrects the standard annual energy consumption to an ambient temperature of 24 °C, with values as set out in Annex III, Table 4;
- (35) 'equivalent model' means a model which has the same technical characteristics relevant for the technical information to be provided, but which is placed on the market or put into service by the same manufacturer, importer or authorised representative as another model with a different model identifier;
- (36) 'model identifier' means the code, usually alphanumeric, which distinguishes a specific product model from other models with the same trade mark or the same supplier's name;
- (37) 'refrigerator-freezer' means a combi appliance that has at least one freezer compartment and at least one fresh food compartment.
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ANNEX II

Ecodesign requirements

1. Energy efficiency requirements:

- (a) From 1 March 2021, the energy efficiency index (EEI) of refrigerating appliances shall not be above the values as set out in Table 1.

Table 1

Maximum EEI for refrigerating appliances, expressed in %

	EEI
dedicated low noise refrigerating appliances with fresh food compartment(s)	375
low noise refrigerating appliances with transparent doors	380
other low noise refrigerating appliances, with the exception of low noise combi appliances with a frozen compartment	300
wine storage appliances with transparent doors	190
other wine storage appliances	155
all other refrigerating appliances, with the exception of low noise combi appliances with a frozen compartment	125

- (b) From 1 March 2024, the EEI of refrigerating appliances shall not be above the values set out in Table 2.

Table 2

Maximum EEI for refrigerating appliances, expressed in %

	EEI
dedicated low noise refrigerating appliances with fresh food compartment(s)	312
low noise refrigerating appliances with transparent door(s)	300
other low noise refrigerating appliances, with the exception of low noise combi appliances with a frozen compartment	250
wine storage appliances with transparent door(s)	172
other wine storage appliances	140
all other refrigerating appliances, with the exception of low noise combi appliances with a frozen compartment	100

2. Functional requirements:

From 1 March 2021, refrigerating appliances shall meet the following requirements:

- (a) Any fast freeze facility, or any similar function achieved through modification of the temperature settings in freezer compartments, shall, once activated by the end-user according to the manufacturer's, the importer's or authorised representative's instructions, automatically revert to the previous normal storage conditions after no more than 72 hours.
- (b) Winter settings shall be automatically activated or de-activated according to the need to maintain the frozen compartment(s) at the correct temperature.

- (c) Each compartment shall be marked with the appropriate identification symbol. For the frozen compartments this shall be the number of stars of the compartment. For the chill and unfrozen compartments, this shall be an indication, chosen by the manufacturer, the importer or authorised representative, of the type of food that should be stored in the compartment.
- (d) If the refrigerating appliance contains vacuum insulation panels, the refrigerating appliance shall be labelled with the letters 'VIP' in a clearly visible and readable way.
- (e) For 2-star sub-compartments or 2-star sections:
 - a 2-star sub-compartment or 2-star section is separated from the 3-star or 4-star volume by a partition, container, or similar construction;
 - the volume of the 2-star sub-compartment or 2-star section does not exceed 20 % of the total volume of the containing compartment.
- (f) For 4-star compartments, the specific freezing capacity shall be such that the freezing time to bring the temperature of the light load (3,5 kg/100 l) from +25 to - 18 °C at an ambient temperature of 25 °C, is smaller than or equal to 18,5 h.

Until 1 March 2024, the requirements laid down in points 2(a) and (b) shall not apply to combi appliances with one electromechanical thermostat and one compressor which are not equipped with an electronic control board.

3. Resource efficiency requirements:

From 1 March 2021, refrigerating appliances shall meet the following requirements:

(a) Availability of spare parts:

- (1) manufacturers, importers or authorised representatives of refrigerating appliances shall make available to professional repairers at least the following spare parts: thermostats, temperature sensors, printed circuit boards and light sources, for a minimum period of seven years after placing the last unit of the model on the market;
- (2) manufacturers, importers or authorised representatives of refrigerating appliances shall make available to professional repairers and end-users at least the following spare parts: door handles, door hinges, trays and baskets for a minimum period of seven years and door gaskets for a minimum period of 10 year, after placing the last unit of the model on the market;
- (3) manufacturers shall ensure that these spare parts can be replaced with the use of commonly available tools and without permanent damage to the appliance;
- (4) the list of spare parts concerned by point (1) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, at the latest two years after the placing on the market of the first unit of a model and until the end of the period of availability of these spare parts;
- (5) the list of spare parts concerned by point (2) and the procedure for ordering them and the repair instructions shall be publicly available on the manufacturer's, the importer's or authorised representative's free access website, at the moment of the placing on the market of the first unit of a model and until the end of the period of availability of these spare parts.

(b) Access to repair and maintenance information:

After a period of two years after the placing on the market of the first unit of a model or of an equivalent model, and until the end of the period mentioned under (a), the manufacturer, importer or authorised representative shall provide access to the appliance repair and maintenance information to professional repairers in the following conditions:

- (1) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, manufacturers, importers or authorised representative may require the professional repairer to demonstrate that:
 - (i) the professional repairer has the technical competence to repair refrigerating appliances and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;
 - (ii) the professional repairer is covered by insurance covering liabilities resulting from its activity, regardless of whether this is required by the Member State;

- (2) the manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request by the professional repairer;
- (3) manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates. A fee is reasonable if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;

Once registered, a professional repairer shall have access, within one working day after requesting it, to the requested repair and maintenance information. The available repair and maintenance information shall include:

- the unequivocal appliance identification;
- a disassembly map or exploded view;
- list of necessary repair and test equipment;
- component and diagnosis information (such as minimum and maximum theoretical values for measurements);
- wiring and connection diagrams;
- diagnostic fault and error codes (including manufacturer-specific codes, where applicable); and
- data records of reported failure incidents stored on the refrigerating appliance (where applicable).

(c) Maximum delivery time of spare parts:

- (1) during the period mentioned under point 3(a)(1) and point 3(a)(2), the manufacturer, importer or authorised representatives shall ensure the delivery of the spare parts for refrigerating appliances within 15 working days after having received the order;
- (2) in the case of spare parts available only to professional repairers this availability may be limited to professional repairers registered in accordance with point b.

(d) Requirements for dismantling for material recovery and recycling while avoiding pollution:

- (1) manufacturers, importers or authorised representatives shall ensure that refrigerating appliances are designed in such a way that the materials and components referred to in Annex VII to Directive 2012/19/EU can be removed with the use of commonly available tools;
- (2) manufacturers, importers and authorised representatives shall fulfil the obligations laid down in Point 1 of Article 15 of Directive 2012/19/EU.

4. Information requirements:

From 1 March 2021, instruction manuals for installers and end-users, and free access website of manufacturers, importers or authorised representatives shall include the following information:

- (a) the combination of drawers, baskets and shelves that result in the most efficient use of energy for the refrigerating appliance;
- (b) clear guidance about where and how to store foodstuffs in a refrigerating appliance for best preservation over the longest period, to avoid food waste;
- (c) the recommended setting of temperatures in each compartment for optimum food preservation. These settings shall not contradict the storage conditions set out in Annex III, Table 3;

- (d) an estimation of the impact of temperature settings on food waste;
 - (e) a description of the effects of special modes and features, and in particular how temperatures are affected in each compartment and for how long;
 - (f) for wine storage appliances: 'this appliance is intended to be used exclusively for the storage of wine'. This shall not apply to refrigerating appliances that are not specifically designed for wine storage but may be used for this purpose, or to refrigerating appliances that have a wine storage compartment combined with any other compartment type;
 - (g) instructions for the correct installation and end-user maintenance, including cleaning, of the refrigerating appliance;
 - (h) for a freestanding appliance: 'this refrigerating appliance is not intended to be used as a built-in appliance';
 - (i) for appliances without a 4-star compartment: 'this refrigerating appliance is not suitable for freezing foodstuffs';
 - (j) access to professional repair, such as internet webpages, addresses, contact details;
 - (k) relevant information for ordering spare parts, directly or through other channels provided by the manufacturer, importer or authorised representative;
 - (l) the minimum period during which spare parts, necessary for the repair of the appliance, are available;
 - (m) the minimum duration of the guarantee of the refrigerating appliance offered by the manufacturer, importer or authorised representative;
 - (n) for refrigerating appliances with climate class:
 - extended temperate: 'this refrigerating appliance is intended to be used at ambient temperatures ranging from 10 °C to 32 °C';
 - temperate: 'this refrigerating appliance is intended to be used at ambient temperatures ranging from 16 °C to 32 °C';
 - subtropical: 'this refrigerating appliance is intended to be used at ambient temperatures ranging from 16 °C to 38 °C';
 - tropical: 'this refrigerating appliance is intended to be used at ambient temperatures ranging from 16 °C to 43 °C';
 - (o) instruction on how to find the model information in the product database, as defined in Regulation (EU) 2019/2016 by means of a weblink that links to the model information as stored in the product database or a link to the product database and information on how to find the model identifier on the product.
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ANNEX III

Measurement methods and calculations

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 takes into account the generally recognised state-of-the-art methods and are in line with the 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) for refrigerating appliances with anti-condensation heaters that can be switched on and off by the end-user, the anti-condensation heaters shall be switched on and — if adjustable — set at maximum heating and included in the annual energy consumption (AE) as daily energy consumption (E_{daily});
 - (b) for refrigerating appliances with ambient controlled anti-condensation heaters, the ambient controlled electric anti-condensation heaters shall be switched off or otherwise disabled, where possible, during the measurement of energy consumption;
 - (c) for refrigerating appliances with dispensers that can be switched on and off by the end-user, the dispensers shall be switched on during the energy consumption test but not operating;
 - (d) for the measurement of energy consumption, variable temperature compartments shall operate at the lowest temperature that can be set by the end-user to continuously maintain the temperature range, as set out in Table 3, of the compartment type which has the lowest temperature;
 - (e) for refrigerating appliances that can be connected to a network, the communication module shall be activated but there is no need to have a specific type of communication or data exchange or both during the energy consumption test. During the energy consumption test it has to be ensured that the unit is connected to a network;
 - (f) for the performance of chill compartments:
 - (1) for a variable temperature compartment rated as a fresh food and/or chill compartment, the energy efficiency index (EEI) shall be determined for each temperature condition and the highest value shall be applied;
 - (2) a chill compartment shall be able to control its average temperature within a certain range without user-adjustments of its control, this can be verified during the energy consumption tests at 16 °C and 32 °C ambient temperature;
 - (g) for adjustable volume compartments, when the volumes of two compartments are adjustable relative to one another by the end-user, the energy consumption and the volume shall be tested when the volume of the compartment with the higher target temperature is adjusted to its minimum volume;
 - (h) the specific freezing capacity is calculated as 12 times the light load weight, divided by the freezing time to bring the temperature of the light load from +25 to -18 °C at an ambient temperature of 25 °C expressed in kg/12 h and rounded to one decimal place; the light load weight is 3,5 kg per 100 litre of the compartment volume of the frozen compartments, and shall be at least 2,0 kg;
 - (i) for the determination of the climate classes, the acronym for the ambient temperature range, that is SN, N, ST or T:
 - (1) the extended temperate (SN) has a temperature range from 10 °C to 32 °C;
 - (2) the temperate (N) has a temperature range from 16 °C to 32 °C;
 - (3) the subtropical (ST) has a temperature range from 16 °C to 38 °C; and
 - (4) the tropical (T) has a temperature range from 16 °C to 43 °C.

2. Storage conditions and target temperatures per compartment type:

Table 3 sets out the storage conditions and target temperature per compartment type.

3. Determination of the AE:

(a) For all refrigerating appliances, except for low noise refrigerating appliances:

The energy consumption shall be determined by testing at an ambient temperature of 16 °C and 32 °C.

To determine the energy consumption, the average air temperatures in each compartment shall be equal to or below the target temperatures specified in Table 3 for each compartment type claimed by the manufacturer, the importer or authorised representative. Values above and below target temperatures may be used to estimate the energy consumption at the target temperature for each relevant compartment by interpolation, as appropriate.

The main components of energy consumption to be determined are:

- a set of steady state power consumption values (P_{ss}), expressed in W and rounded to one decimal place, each at a specific ambient temperature and at a set of compartment temperatures, which are not necessarily the target temperatures;
- the representative incremental defrost and recovery energy consumption (ΔE_{d-f}), expressed in Wh and rounded to one decimal place, for products with one or more auto-defrost systems (each with its own defrost control cycle) measured at an ambient temperature of 16 °C (ΔE_{d-f16}) and 32 °C (ΔE_{d-f32});
- defrost interval (t_{d-f}), expressed in h and rounded to three decimal places, for products with one or more defrost systems (each with its own defrost control cycle) measured at an ambient temperature of 16 °C (t_{d-f16}) and 32 °C (t_{d-f32}). t_{d-f} shall be determined for each system under a certain range of conditions;
- for each test performed the P_{ss} and ΔE_{d-f} are added together to form a daily energy consumption at a certain ambient temperature $E_T = 0,001 \times 24 \times (P_{ss} + \Delta E_{d-f}/t_{d-f})$, expressed in kWh/24 h, specific to the settings applied;
- E_{aux} , expressed in kWh/a and rounded to three decimal places. E_{aux} is limited to the ambient controlled anti-condensation heater and is determined from the heater's power consumption at a number of ambient temperature and humidity conditions, multiplied with the probability that this ambient temperature and humidity condition occurs and summed; this result is subsequently multiplied with a loss factor to account for heat leakage into the compartment and its subsequent removal by the refrigeration system.

Table 3

Storage conditions and target temperature per compartment type

Group	Compartment type	Note	Storage conditions		T_c
			T_{min}	T_{max}	
Name	Name	no.	°C	°C	°C
Unfrozen compartments	Pantry	(1)	+14	+20	+17
	Wine storage	(2) (6)	+5	+20	+12
	Cellar	(1)	+2	+14	+12
	Fresh food	(1)	0	+8	+4

Group	Compartment type	Note	Storage conditions		T_c
			T_{min}	T_{max}	
Name	Name	no.	°C	°C	°C
Chill compartment	Chill	(²)	-3	+3	+2
Frozen compartments	0-star & ice-making	(⁴)	n.a.	0	0
	1-star	(⁴)	n.a.	-6	-6
	2-star	(⁴) (⁵)	n.a.	-12	-12
	3-star	(⁴) (⁵)	n.a.	-18	-18
	freezer (4-star)	(⁴) (⁵)	n.a.	-18	-18

Notes:

- (¹) T_{min} and T_{max} are the average values measured over the test period (average over time and over a set of sensors).
(²) The average temperature variation over the test period for each sensor shall be no more than $\pm 0,5$ kelvin (K). During a defrost and recovery period the average of all sensors is not permitted to rise more than 1,5 K above the average value of the compartment.
(³) T_{min} and T_{max} are the instantaneous values during the test period.
(⁴) T_{max} is the maximum value measured over the test period (maximum over time and over a set of sensors).
(⁵) If the compartment is of the auto-defrosting type, the temperature (defined as the maximum of all sensors) is not permitted to rise more than 3,0 K during a defrost and recovery period.
(⁶) T_{min} and T_{max} are the average values measured over the test period (average over time for each sensor) and define the maximum allowed temperature operating range.
n.a = not applicable

Each of these parameters shall be determined through a separate test or set of tests. Measurement data is averaged over a test period which is taken after the appliance has been in operation for a certain time. To improve the efficiency and accuracy of testing, the length of the test period shall not be fixed; it shall be such that the appliance is in steady state condition during this test period. This is validated by examining all data within this test period against a set of stability criteria and whether enough data could be collected in this steady state.

AE, expressed in kWh/a and rounded to two decimal places, shall be calculated as follows:

$$AE = 365 \times E_{daily}/L + E_{aux}$$

with

- the load factor $L = 0,9$ for refrigerating appliances with only frozen compartments and $L = 1,0$ for all other appliances; and
- with E_{daily} , expressed in kWh/24 h and rounded to three decimal places calculated from E_T at an ambient temperature of 16 °C (E_{16}) and at an ambient temperature of 32 °C (E_{32}) as follows:

$$E_{daily} = 0,5 \times (E_{16} + E_{32})$$

where E_{16} and E_{32} are derived by interpolation of the energy test at the target temperatures set out in Table 3.

(b) For low noise refrigerating appliances:

The energy consumption shall be determined as provided for in point 3(a), but at an ambient temperature of 25 °C instead of at 16 °C and 32 °C.

E_{daily} , expressed in kWh/24 h 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 3.

4. Determination of the standard annual energy consumption (SAE):

(a) For all refrigerating appliances:

SAE, expressed in kWh/a and rounded to two decimal places, is calculated as follows:

$$SAE = C \times D \times \sum_{c=1}^n A_c \times B_c \times [V_c/V] \times (N_c + V \times r_c \times M_c)$$

where

— c is the index number for a compartment type ranging from 1 to n , with n the total number of compartment types;

— V_c , expressed in dm³ or litres and rounded to the first decimal place is the compartment volume;

— V , expressed in dm³ or litres and rounded to the nearest integer, is the total volume with $V \leq \sum_{c=1}^n V_c$;

— r_c , N_c , M_c and C are modelling parameters specific to each compartment with values as set out in Table 4; and

— A_c , B_c and D are the compensation factors with values as set out in Table 5.

When carrying out the calculations above, for the variable temperature compartments, the compartment type with the lowest target temperature for which it is declared suitable is chosen.

(b) Modelling parameters per compartment type for the calculation of SAE:

The modelling parameters are set out in Table 4.

Table 4

The values of the modelling parameters per compartment type

Compartment type	r_c ^(a)	N_c	M_c	C
Pantry	0,35	75	0,12	between 1,15 and 1,56 for combi appliances with 3- or 4-star compartments ^(b) , 1,15 for other combi appliances, 1,00 for other refrigerating appliances
Wine storage	0,60			
Cellar	0,60			
Fresh food	1,00			
Chill	1,10	138	0,12	
0-star & ice-making	1,20	138	0,15	
1-star	1,50			
2-star	1,80			
3-star	2,10			
Freezer (4-star)	2,10			

^(a) $r_c = (T_a - T_c)/20$; with $T_a = 24$ °C and T_c with values as set out in Table 3.

^(b) C for combi appliances with 3- or 4-star compartments is determined as follows:

where $frzf$ is the 3- or 4-star compartment volume V_{fr} as a fraction of V with $frzf = V_{fr}/V$:

- if $frzf \leq 0,3$ then $C = 1,3 + 0,87 \times frzf$;
- else if $0,3 < frzf < 0,7$ then $C = 1,87 - 1,0275 \times frzf$;
- else $C = 1,15$.

(c) Compensation factors per compartment type in the calculation of SAE:

The compensation factors are set out in Table 5.

Table 5

The values of the compensation factors per compartment type

Compartment type	A_c		B_c		D			
	Manual defrost	Auto-defrost	Freestanding appliance	Built-in appliance	≤ 2 ^(a)	3 ^(a)	4 ^(a)	> 4 ^(a)
Pantry	1,00		1,00	1,02	1,00	1,02	1,035	1,05
Wine storage								
Cellar								
Fresh food								
Chill				1,03				
0-star & ice-making	1,00	1,10		1,05				
1-star								
2-star								
3-star								
Freezer (4-star)								

^(a) number of external doors or compartments, whichever is lowest.

5. Determination of the EEI:

EEI, expressed in % and rounded to the first decimal place, calculated as:

$$EEI = AE/SAE.$$

ANNEX IV

Verification procedure for market surveillance purposes

The verification tolerances set out in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer, importer or authorised representative 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 communicating better performance by any means.

Where a model has been designed to be able to detect it is being tested (e.g. by recognising the test conditions or test cycle), and to react specifically by automatically altering its performance during the test with the objective of reaching a more favourable level for any of the parameters specified in this Regulation or included in the technical documentation or included in any of the documentation provided, the model and all equivalent models shall be considered not compliant.

When verifying the compliance of a product model with the requirements laid down in this Regulation pursuant to Article 3(2) 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, importer or authorised representative than the results of the corresponding measurements carried out pursuant to point (g) thereof; and
 - (b) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values; and
 - (c) when the Member State authorities check the unit of the model, they check whether the manufacturer, importer or authorised representative has put in place a system that complies with the requirements in the second paragraph of Article 6; and
 - (d) when the Member State authorities check the unit of the model, it complies with the functional requirements in point 2 of Annex II points from (a) to (f) and the requirements on resource efficiency in point 3 of Annex II; and
 - (e) 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 set out in Table 6.
3. If the results referred to in point 2(a), (b), (c) or (d) are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.
4. If the result referred to in point 2(e) 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 equivalent models.
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 set out in Table 6.
6. If the result referred to in point 5 is not achieved, the model and all equivalent models 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 once a decision has been taken on the non-compliance of the model according to points 3 or 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 6 and shall use only the procedure described in points 1 to 7 for the requirements set out in this Annex. For the parameters in Table 6, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 6

Verification tolerances

Parameters	Verification tolerances
Total volume and compartment volume	The determined value ^(a) shall not be more than 3 % or 1 litre lower — whichever is the greater value — than the declared value.
Freezing capacity	The determined value ^(a) shall not be more than 10 % lower than the declared value.
E_{16} , E_{32}	The determined value ^(a) shall not be more than 10 % higher than the declared value.
E_{aux}	The determined value ^(a) shall not be more than 10 % higher than the declared value.
Annual energy consumption	The determined value ^(a) shall not be more than 10 % higher than the declared value.
Internal humidity of wine storage appliances (%)	The determined value ^(a) shall not differ from the limits of the prescribed range by more than 10 %.
Airborne acoustical noise emission	The determined value ^(a) shall not be more than 2 dB(A) re 1 pW more than the declared value.

^(a) in the case of three additional units tested as prescribed in point 4, the determined value means the arithmetic mean of the values determined for these three additional units.

ANNEX V

Benchmarks

At the time of entry into force of this Regulation, the best available technology on the market for refrigerating appliances in terms of their energy efficiency index (EEI) and airborne acoustical noise emissions was identified as outlined below.

The figures below were obtained using a simplified conversion from the EEI-values as determined according to Regulation (EC) No 643/2009. The figures in brackets indicate the EEI-value as determined according to Regulation (EC) No 643/2009.

Refrigerating appliances:

Dedicated fresh food refrigerating appliance ('refrigerator'):

Large: EEI = 57 % [18 %], V = 309 litre, AE = 70 kWh/a

Table-top: EEI = 63 % [22 %], V = 150 litre, AE = 71 kWh/a

Wine storage appliance:

Insulated external door: EEI = 113 % [33 %], V = 499 litre, AE = 111 kWh/a

Transparent door: EEI = 140 % [42 %], V = 435 litre, AE = 133 kWh/a

Refrigerator-freezer:

EEI = 59 % [18 %], V = 343 litres (223/27/93 litres for fresh-food/chill/freezer), AE = 146 kWh/a

Freezer:

Upright Small: EEI = 52 % [20 %], V = 103 litre, AE = 95 kWh/a

Upright Medium: EEI = 63 % [22 %], V = 206 litre, AE = 137 kWh/a

Chest: EEI = 55 % [22 %], V = 230 litre, AE = 116 kWh/a

Lowest noise reported (of all models): 34-35 dB(A) re 1 pW

Low-noise refrigerating appliance (dedicated cellar or pantry refrigerating appliance):

Insulated external door: EEI = 233 % [73 %], V = 30 litre, AE = 182 kWh/a

Transparent door: EEI = 330 % [102 %], V = 40 litre, AE = 255 kWh/a

Low noise appliances are reported to have airborne acoustical noise emissions lower than 15 dB(A) re 1 pW according to current test standards.