

**WORKING DOCUMENT**  
**ON A POSSIBLE COMMISSION DIRECTIVE**  
**IMPLEMENTING COUNCIL DIRECTIVE 92/75/EC WITH REGARD TO**  
**HOUSEHOLD REFRIGERATING APPLIANCES**

**Explanatory Notes**

**Rationale of the draft directive**

**Scope**

The purpose of the directive is to set a revised labelling scheme on the energy efficiency and other aspects of electric mains operated household refrigerating appliances with the aim to reduce the related energy consumption (as required in Directive 95/75/EEC). The directive applies to refrigerating appliances also when sold for non-household uses (for example to refrigerate foodstuffs in hotels or in other tertiary sector applications) or when they are used for the refrigeration of items different from foodstuffs (for example in beauty centres for the refrigeration of creams and similar items).

The definition of refrigerating appliances has been updated, to take into consideration also the experience existing at international levels – and to clarify that some product such as the wine cabinets and the mini drink chillers are now included. The definitions and the appliance classification have also been made more clear to address the ambiguities identified for some specific products during the long term application of the energy labelling Directives.

**Relation with unspecific ("horizontal") IMs**

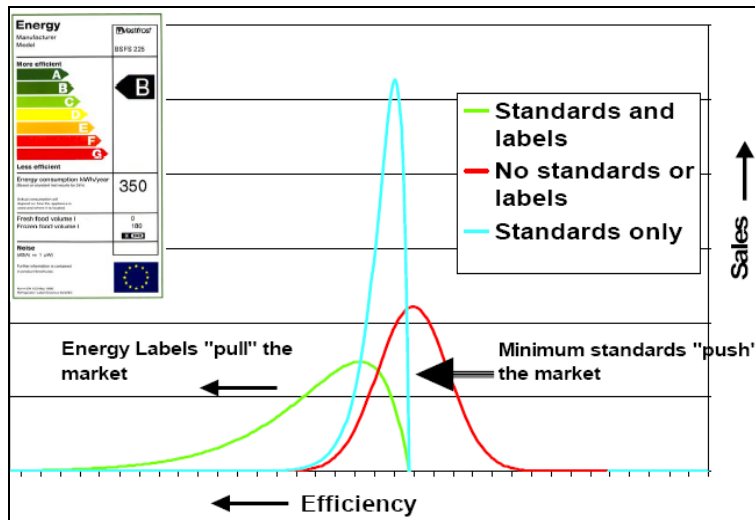
This product specific directive has no actual relation with horizontal ecodesign IMs, such as the standby power consumption Regulation, since the 24h measurement of the energy consumption necessary for the covered refrigerating appliances already considers the consumption of any features such as temperature displays, clocks, temperature alarms, through-the-door-dispensers, etc. which may present low power modes consumption.

The parallel ecodesign implementing measure on refrigerating appliances is nevertheless taking care of the very small appliances under 10 litre of storage volume (excluded from this directive) which will be requested to automatically enter into a condition with a power consumption of 0,00 Watts after no more than 1 hour when empty.

**Relation with other energy efficiency policy measures**

An effective coordination is necessary between this directive and the Ecodesign implementing measure (under framework Directive 2005/32/EC) for refrigerating appliances. It is the intention that the two policies will share not only the basic definitions and the appliance classification in 10 Categories, but also the algorithms for the calculation of the Energy Efficiency Index. This will remove differences in scope and thresholds between directives 96/57/EC and 94/2/EC or 2003/66/EC. This

harmonisation will allow an optimum co-ordination of the dynamic steps and revision time horizon, which will insure a synergic effect of the pushing effect of the eco-design specific requirements and the pulling effect of the new labelling energy efficiency scale, according to the qualitative but well experienced relation<sup>1</sup>:



## Labelling requirements

Appliance classification: refrigerating appliances are classified in 10 Categories, characterized by the storage temperature of their compartments, which shall be met to qualify an appliance for a specific Category. The classification is independent from the number of appliance compartments and external doors or drawers.

Energy efficiency ranking and class specifications: the Energy Efficiency Index is used to specify an energy efficiency ranking divided into 10 levels going from 1 (less efficient) to 10 (most efficient). Contemporarily, energy efficiency classes from G to A have been added for sake of continuity with the current labelling scheme and to inform consumer about the energy efficiency range of existing products during the specific validity period of the label. The period of the validity of the label is the interval between the year of beginning and of expiring of each step, in the form '20XX-20XX'. Additional non-energy information are also included in the label layout.

Technical Fiche specifications: are set in terms of information to be included in addition to those already present in the label: power cut safe time, freezing capacity (for freezers), climate class and the indication of the minimum/maximum ambient temperature at which the appliance can be used, built-in construction.

Other communication: information to be delivered where appliances are offered for sales by any means which imply that the potential customer cannot be expected to see them displayed. In particular for wine storage appliances information about the specific intended use will be given.

## Energy labelling timing and revision

<sup>1</sup> IEA, P. Waide, International use of policy instruments: country comparisons, Copenhagen, 05 April 2006.

The label is set in two stages: Step 1 to be implemented one year after the entry into force of the directive, and Step 2 to be implemented six years after the entry into force of the directive. It is recommended that these two Steps possibly correspond as much as possible with the corresponding phase-out of least efficient refrigerating appliances via the parallel ecodesign Regulation on refrigerating appliances.

The one year transition period after entry into force encompassed in the first Step should allow industry to prepare the declarations, the labels and the communications for the appliance technologies: compression-type, absorption- and other-type of appliances, the latter being almost exclusively thermoelectric models, being thermoelectric cooling the only other cooling technology currently on the market for household applications.

It is planned to examine the necessity to revise this directive at the latest 7 years after adoption, which is after the second Step will be implemented. This revision should be possibly developed in parallel with the revision of the above mentioned ecodesign Regulation on refrigerating appliances.

### **Rationale for the mandatory labelling**

The aim is to improve the environmental impact of refrigerating appliances through a mandatory two step labelling scheme based on an energy efficiency index related to the annual energy consumption of each appliance model.

An effective co-ordination with the specific requirements on energy efficiency set in the on-going Ecodesign implementing measure for the same product group is recommended to achieve a synergy between the two policy measures.

The use phase is addressed through the energy efficiency rating on the label since the LCA performed for the compression-type appliances (representing over 95% of the overall refrigerating appliance market in the EU) in the ecodesign preparatory study demonstrated that, despite the significant achieved energy efficiency improvement, this life phase is still responsible for most of the environmental impact of this product group. Noise declaration is also foreseen.

The proposed labelling adopts a unique energy efficiency ranking for the three major types of refrigerating appliances covered by the directive (compression and absorption/other types). The zero-noise added value of the absorption-type and other-type (thermoelectric) refrigerators is highlighted in the part of the label devoted to the noise declaration. The zero-noise allows the use of these appliances in rooms and spaces (e.g. hotels, hospitals) where the absence of noise is of primarily importance, although their energy efficiency is lower than for a compressor-type refrigerating appliance of the same volume. Compressor refrigerators can reach a low noise emission, but still not the same as the absorption/thermoelectric technologies: at present there are no noiseless alternatives to absorption/thermoelectric products in applications where noise is a major issue.

### **Verification procedure for market surveillance purposes**

European standard EN 153 describes a two-stage verification procedure which is used for the EU labelling scheme. This staged procedure is acceptable for the verification of this directive, but the values of the measurement uncertainty include at present the production variability, which is today considered as being part of the overall appliance quality and therefore under manufacturers' responsibility. On the other hand the variability of the measurement method and in testing shall remain under the responsibility of standardisation bodies and test laboratories.

The proposed revised verification procedure foresees a lower measurement uncertainty of 10% for a single product while requiring that the average of the product sample under test (three more units) has to meet the requested EEI value (with the same uncertainty). This approach avoids that a refrigerating appliance declared in one energy efficiency level is then found as belonging to two levels less due to the uncertainty in the verification.

This procedure will remain valid until a suitable harmonised standard is prepared by the relevant ESOs under a specific mandate issued by the Commission after the consultation with Member States and stakeholders.

For wine storage appliances evidence shall be provided that the appliance complies with the technical characteristics which grant the exemption from the provisions in Annexes III and IV.

### **Detailed explanation of the directive**

Chapter 1: the scope of the directive is described, to cover electric mains operated household refrigerating appliances for foodstuffs (including therefore food and beverages) also when they are sold for non-household uses or for non-foodstuffs refrigeration. The scope is then refined through some exemptions which exclude for example appliances operated with fuels (such as LPG, kerosene, biodiesel) and batteries and appliances designed primarily for specific applications outside the household food preservation. In particular appliances specifically designed to be operated through the mains, but that can be also use batteries are included; vice-versa models designed to be primarily operate through batteries but that can also be connected to the mains are excluded.

Chapter 2: definitions are provided for the terms used in the labelling parameters set out in the Annexes. Some definitions have been set to complement those in EN 153, the reference standard for refrigerating appliances in Europe, taking into consideration policy measures and experiences outside the EU and to allow the inclusion of the so called 'wine cellars' and 'mini drinks chillers' in the directive. Additional applicable definitions are set in Annex I Part 1.

Chapter 3: sets the elements to be included in the necessary technical documentation referred to in Article 2 (3) of the framework Directive 92/75/EEC.

Chapter 4: refrigerating appliance classification and energy efficiency ranking and class are set with simple reference to Annexes I (Part 2) and II which contain the actual energy efficiency classification and rating description.

Chapter 5: the layout and content of the label is set with a reference to Annex III, which contain the actual layout and parameters to be supplied. A specific exemption for wine storage appliances is provided at the end of the Annex, due to the very specific characteristics of this refrigerating appliance group and the absence of an appropriate measurement method at worldwide level. Refrigerating appliances including a wine storage compartment are instead clearly included in the directive.

Chapter 6: the content of the technical fiche referred to in the third indent of Article 2 (1) of Directive 92/75/EEC is set with a reference to Annex IV, which contain the actual layout and parameters to be supplied. Also in this case wine storage appliances are exempted, but refrigerating appliances including a wine storage compartment are instead clearly included.

Chapter 7: defines the information to be provided when the potential customer cannot be expected to see the appliance displayed but it is nevertheless offered for sale, hire or hire purchase by any paper or electronic mean, with a reference to Annex V, which contain the actual parameters to be supplied. Wine storage appliances are covered by this Annex through the mandatory indication about their specific application to be provided to users. The same indication is included in the booklet of instructions through a generic requirement in the parallel ecodesign Regulation on refrigerating appliances.

Chapter 8: sets the transitory period between the directive adoption and the application of the first Step of the label in the EU, along with the further transition period when the second Step is implemented: for three month Member States shall allow the circulation of appliances bearing the previous label.

Chapter 9: a verification procedure for market surveillance purposes already exists for refrigerating appliances set out in the harmonised standard EN 153, providing compliance with measurements under the refrigerator and freezers energy label directives 94/2/EC and 2003/66/EC. Through the provisions in this Chapter and in Annex VI, the verification procedure is extended to all refrigerating appliances under the scope of this directive and is also made more rigorous by placing under the manufacturers' responsibility the manufacturing process variability.

Chapter 10: the repeal of Directives 94/2/EC and 2003/66/EC is necessary because the labelling scheme set in 1995 and revised in 2004 is replaced by the new layout and requirements.

Chapter 11: the revision of the directive is foreseen no later than 7 years after its entry into force, which is just after the implementing of the second Step of labelling (and of the specific requirements of the parallel ecodesign implementing measure). This revision will evaluate the technological progress and the technical and economical feasibility of a further labelling.

Chapter 12: the provisions for the adoption by the Member States are set in 12 months after the entry into force of the directive.

Chapters 13 and 14: deals with the entry into force and the addressee of the directive.

Annex I: In **Part 1**, additional applicable definitions about compartments type are set to complement those in EN 153 standard.

In **Part 2**, the refrigerating appliance classification is set. Ten categories of appliance are set and described in their essential elements, especially the mandatory and optional compartments which qualify a refrigerating appliance model for a specific category. In this directive same the ten Categories of previous directives 94/2/EC and 2003/66/EC are used. Definitions have been improved and made clearer to avoid some ambiguity identified and described in the preparatory ecodesign study and in previous SAVE studies on refrigerating appliances. In particular the proposed classification is independent from the number of doors and compartments and an appliance is classified in a specific Category from 1 to 9 if the mandatory compartment or compartments are present; optional compartments are also possible but their presence is not sufficient for the classification purposes. Category 10 has been confirmed as a catch-all category, to be used if the classification in the previous 9 categories has failed or in case of multi-use cabinets.

Annex II: sets out the energy efficiency ranking and the energy efficiency class of refrigerating appliances. The energy efficiency rating is independent from the refrigerating appliance technology and based on the Energy Efficiency Index, calculated as described in Annex VII. The energy efficiency ranking goes from 1, with the lowest efficiency, to 10 with the highest efficiency. Each level corresponds to an equal effort of about 20-25% efficiency improvement. Ten levels are deemed necessary to describe the full refrigerating appliance market covered by the labelling directive. In fact, the compressor-type appliances are more efficient but more noisy, where the absorption-type and the thermoelectric-type appliances are less efficient but noiseless. There is therefore the need to make consumer aware of these differences among products by indicating contemporarily the energy efficiency ranking of the appliances and their noise.

The annual market of the electric absorption refrigerating appliances is about 250.000 to 300.000 units, compared to the about 18 million compressor refrigerators. The sales are concentrated in specific sectors, mainly hotels (where they are called mini-bars), followed by household applications (in compact living spaces, offices and rooms outside the kitchen where they are called mini-coolers). The market of the household thermoelectric appliances with a storage volume equal or larger than 10 litres is estimated to be significantly smaller than for the absorption appliances.

In Table 3 the energy efficiency ranking is complemented by energy efficiency classes from G to A, deriving from the current labelling scheme, and which describe the appliance energy efficiency range existing during the specific validity period of the label. The period of the validity of the label is the interval between the year of beginning and of expiring of each Step in the form '20XX-20XX' as described in Annex III.

Annex III: sets the layouts of the label and the elements to be included in it along with the printing and design elements. In **Part 1** the Label layout and timing are set. A two-step implementation of the labelling is foreseen, the first step one year after the enforcement of the directive, the second step five years later (i.e. six years after the enforcement of the directive). **Part 2** of the Annex includes the explanatory notes to the information included in the label. In **Part 3** the design characteristics of the layout are described for the printing. **Part 4** included the exemption for wine storage appliances.

Annex IV: sets the elements in the technical fiche, in addition to the elements already presented in the label: the minimum and maximum ambient temperatures for correct operation of the appliance, as established by its Climatic Class, should be included.

Annex V: sets the other communications mandatory when the appliance is advertised and offered for sale, hire or hire purchase to potential customers which are not expected to see the it displayed. Any printed or written communication, mail order catalogues and other printed communications, advertisements on the Internet or on other electronic media is included. The specific information to be delivered in case of wine storage appliances is also set.

Annex VI: contains provisions on the verification procedure to be applied by the Member States' authorities when performing market surveillance checks referred to in Directive 2005/32/EC, Article 3 (2) and until a suitable harmonised standard is published for the purpose of this Annex.

Annex VII: contains the method for calculating the Energy Efficiency Index (EEI) of refrigerating appliances, which is common with the parallel ecodesign implementing measure.

In **Part 1** the algorithms for the calculation of the equivalent volume are set. The equivalent volume of a refrigerating appliance is the weighted sum of the storage volumes of all the compartments, adjusted to compensate for heat loadings on spaces which are at temperatures other than that of fresh food compartment (+5°C) , taken as reference. Five correction factors have been identified to calculate the compartments' equivalent volume:

- the thermodynamic correction factor
- the no frost correction factor
- the built in correction factor
- the transparent door correction factor
- the climate class correction factor.

The thermodynamic correction factor ( $\frac{(25-T_c)}{20}$ ) considers the temperature difference

between the nominal temperature of a compartment and the ambient temperature under standard test conditions compared to the situation of the basic refrigerator compartment, the fresh food one considered at +5°C. This factor varies with the nominal temperature of the different compartment types. For compartments defined in Annex VII this factor has been calculates and is shown in Table 4.

The no frost correction factor (FF): a 1,2 factor is set only for the frozen-food compartments or cabinets. The specific analysis developed during a previous SAVE study of 2000 showed that depending on the no-frost technology used, under the EN 153 test conditions no-frost appliances would be expected to use between 3,5% and 15% more energy than equivalent natural-convection appliances. For partial no-frost appliances with a 'no-frost' refrigerator compartment and a natural-convection frozen-food compartment, the increment in energy consumption would be expected to be very small and not sufficient to justify the correction factor; conversely, if a combination appliance has a no-frost frozen-food compartment and a natural-convection fresh-food

compartment, a correction factor of 1,2 times the equivalent volume of the freezer compartment appears to be justified.

The built in correction factor (BI): a 1,2 correction factor is set for real built-in products (built-under are excluded) of no more than 58 cm. The rationale is that the external dimensions of built-in appliances are particularly constrained as they have to be incorporated into standard fitted-kitchen designs, which use in general a fixed unit depth and width of 60 cm. In practice this means the appliance should be 55cm deep and 55cm wide if there is to be enough space to add the finishing panels. Constraining the width and depth means that it is only possible to increase the insulation thickness by raising the height if the internal volume is to remain constant (but this modifies the product dimensions) or to use vacuum insulation panels but the energy-engineering analysis for free standing products developed in the preparatory study has indicated that they are not yet cost-effective for the consumer.

The transparent door correction factor (TD): a 1,05 correction factor is set for those compartments (or cabinets) where a transparent door is applied when the free transparent area is higher than 90% of the access opening of the compartment or the cabinet.

If a transparent door is used, then energy savings technologies such as a better insulation or vacuum panels can not be applied. A part from being an aesthetic element, a transparent door could allow a better check of the refrigerated products from the outside of the appliance without (or with a shorter) opening the door, thus reducing the energy loss, estimated in the preliminary study in about 25 kWh/year (for the standard base case refrigerator-freezers with an EEI = 54,3, for 8,2 opening per day per person and for 2,9 persons/household).

A simulation was developed, evaluating that if door openings are shortened by one third (33%) through the use of the transparent door, then the loss of about 8,5 kWh/year can be avoided in the same standard base case, or 2,6% of the annual energy consumption. The effect of the 1,05 correction factor on the same base case is to allow an increase of about 2,6% in the appliance energy consumption without modifying its EEI. The 1,05 correction factor for the compartment or the cabinet storage volume seems therefore to be justified.

The climate class correction factor (CC): a 1,1 factor is set for ST-class and 1,2 for T-class appliances (i.e. for model to be able to maintain the correct storage temperature at an ambient temperature up to 43°C).

As a trend in the EU more appliances are receiving multiple climate-class ratings than before and some appliances are even rated at all four climate classes from SN to N to ST to T, as they were to be sold in the cold and warm regions of Europe. It should be therefore considered if the latest values of the correction factors for the ST- and T-class models – as said respectively 1,1 and 1,2 - are appropriate for this measure.

In general, a part from having a higher-capacity compressor, appliances which are designed to operate as ST- and T-class products will employ a number of other design changes, such as higher-grade insulation and larger-capacity heat exchangers. These design changes, which are implemented as a result of the need to meet ST or T class criteria, also have the effect of improving the energy efficiency of the product when tested under EN 153 conditions at 25°C ambient temperature.

The conclusion of the previous SAVE study on refrigerating appliances developed in 1998-2000 was that giving a bonus to ST and T products at low and intermediate

efficiency levels would have encouraged manufacturers to take the cheapest option of making ST- and T-class products rather than using the options which give the best life-cycle cost benefit to the consumer and benefit the environment (improved insulation and higher-capacity heat exchangers). On the contrary any ST- or T-class correction-factor bonus given to products striving to attain the highest efficiency levels would have promoted technological improvement. This outcome was applied in the revision of the energy labelling directive 2003/66/EC where a 1,1 factor is used for the ST-class and a 1,2 factor is used for a T-class appliance, but only for EEI below 42 (current A+ and A++ models).

The same correction factors are kept in this measure due to the fact that the high energy-efficiency levels of today (the market entry level for compressor-type refrigerating appliances will be  $EEI < 55$  one year after the enforcement of this IM) any SN- or N-class product can only be redesigned as an ST- or T-class product by the use of measures which increase its costs beyond the life-cycle optimum, i.e. beyond the LLCC. The same will happen for a ST- or T-class product to be maintained in the same climate class at the decreasing of the EEI needed to comply with the new energy labelling rating.

In **Part 2** the algorithms for the calculation of the Energy Efficiency Index are set. The EEI of a refrigerating appliance model is the ratio between its estimated annual energy consumption and the standard annual energy consumption.

For the calculation of the EEI, the energy consumption of any given appliance is compared to the reference energy consumption (the above mentioned standard annual energy consumption) of the same category of appliance with an identical equivalent volume and the result is expressed as percentage. The standard annual energy consumption is a linear function of the equivalent volume where the intercept (N) and angular coefficient (M) are defined in this directive (Table 6). In addition an allowance of 50 kWh/year in the standard annual energy consumption is given for the presence of a chill compartment of at least 15 litre volume, since this compartment allows a longer preservation of highly perishable food.

Finally, no extra energy consumption allowances are considered for “trough-the-door features”, such as a typical TTD ice-maker or chilled water dispenser, which would increase the appliance annual energy consumption of about 120 kWh (the energy consumption allowance in Australia). These services are not a primary food preservation function of the refrigerating appliances but are pure convenience features, and should not be entitled for any allowance. It might be argued that end-users have to open the appliance door to take ice or chilled water and this will increase also the appliance energy consumption. However, this depends on how many times - out of the total number of door openings - an appliance is opened to take stored ice or cold water which might be instead dispensed; it might be also argued that without this or a soft drink dispensing feature the user will be forced to buy an additional small refrigerator just to have cold drinks easily available. But, if cold drinks are consumed in the same room where the appliance is located (usually the kitchen) there is a very little need of an extra cooler; if on the contrary drinks are consumed in a room different from where the appliance is located, then the need of an extra drink cooler will arise with or without a dispenser available in the main refrigerating appliance.

Through the values provided in Table 6 the maximum allowable annual energy consumption for each refrigerating appliance can be calculated once the equivalent

volume is known. This annual energy consumption can be used for ex-post calculation of the achieved energy savings and for ex-ante evaluation of national/local policy measures such as the tax incentive programmes.

Precision in recording and rounding is also indicated for all calculation steps: the energy consumption in 24 hours ( $E_{24h}$ ) is recorded to the third decimal place, the annual energy consumption and the standard annual energy consumption are recorded to the second decimal place, the EEI value is rounded to first decimal place.

### **Estimated energy savings**

The combined effect of the ecodesign implementing measure and of the new energy labelling scheme have been estimated in the preparatory study for the EU25 countries and for the compressor-type refrigerating appliances, compared to a reference BaU scenario. For refrigerators and refrigerator-freezers the energy savings under the Realistic Scenario, is about 4 TWh in 2020 and 12,5 TWh in 2030. For freezers smaller savings are expected, due to their lower ownership especially in the new Member States, going from 2,5 TWh in 2020 and 5,0 TWh in 2030. In terms of expected energy savings percentage, refrigerators and freezers are quite similar.

It is worth adding that the significant difference between the savings potential foreseen for 2020 and 2030 (the savings are more than doubled) is due to the strong spreading in the market of the models having EEI <20-25.

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*Chapter 1*  
*Subject matter and scope*

1. This Directive shall apply to electric mains operated household refrigerating appliances, even where these are sold for non-household uses and/or for the refrigeration of items different from foodstuffs.

Refrigerating appliances primarily operated through the mains but that can also use batteries are included in the scope.

2. The following appliances and equipments are excluded from the scope of this Directive:

- Refrigerating appliances that can use fuels (such as LPG, kerosene, bio-diesel, etc.);
- Refrigerating appliances that are only battery operated;
- Refrigerating appliances designed to be primarily operated by batteries, but than can be connected to the electric mains through the addition of an AC/DC converter, to be purchased as a separate part, for primary use in non-household applications such as car, caravan, motor caravan, truck, marine, etc.;
- Refrigerating appliances manufactured on a one-off basis;
- Refrigerating appliances for medical applications under the World Health Organisation vaccine refrigerators and freezers specifications;
- Refrigerating appliances in which the removal of refrigerated items is electronically sensed and can be automatically transmitted through a network connection to a remote control system for accounting;
- Equipments where the household storage of foodstuffs through refrigeration is not the primary function (such as stand-alone ice-makers or chilled water/drink dispensers);
- Refrigerating appliances with a storage volume below [10] litres.

3. The information required by this Directive shall be obtained by measurements made in accordance with harmonised standards adopted by the European Standardisation Bodies (CEN, CENELEC, ETSI) under mandate from the Commission in accordance with Directive 98/34/EC of the European Parliament and of the Council<sup>2</sup>, the reference numbers of which have been published in the Official Journal of the European Union and for which Member States have published the reference numbers of the national standards transposing those harmonised standards.

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<sup>2</sup> O.J. ....

## *Chapter 2*

### ***Definitions***

In this Directive the definitions set out in Article 1(4) of Directive 92/75/EEC shall apply. The following definitions shall also apply:

- a) “Foodstuffs” mean food, ingredients, beverages and/or other items primarily intended for consumption, and that require refrigeration at specified temperature conditions.
- b) “Refrigerator” means a refrigerating appliance intended for the preservation of foodstuffs, one of whose compartments - or the unique compartment in case of a single compartment appliance - is suitable for the storage of fresh food and/or beverages including wine.
- c) “Refrigerator-freezer” means a refrigerating appliance having at least one compartment suitable for the storage of fresh food and/or beverages including wine (the fresh-food storage compartment) and at least one other (the food freezer compartment) suitable for the freezing of fresh food and the storage of frozen foodstuffs under three-star storage conditions.
- d) “Frozen-food storage cabinet” means a refrigerating appliance having one or more compartments suitable for the storage of frozen foodstuffs.
- e) “Food freezer” means a refrigerating appliance having one or more compartments suitable for freezing foodstuffs from ambient temperature down to a temperature of -18 °C and which is also suitable for the storage of frozen foodstuffs under three-star storage conditions, although in certain instances, two-star sections and/or compartments are permitted within the compartment or cabinet.
- f) “Wine storage appliance” means a refrigerating appliance having one or more wine storage compartment.
- g) “Multi-use appliance” means a refrigerating appliance having one or more multi-use compartment, as defined in Annex 1
- h) “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 of another refrigerating appliance model placed on the market under a different commercial code number by the same supplier.

The additional definitions set out in Annex I, Part 1 shall also apply.

## *Chapter 3*

### ***Technical documentation***

1. The technical documentation referred to in Article 2 (3) of Directive 92/75/EEC shall include:

- the name and address of the supplier,

- a general description of the appliance, sufficient for it to be identified,
- information, including drawings as relevant, on the main design features of the model and in particular items which appreciably affect its energy consumption,
- reports of relevant measurement tests carried out under the standards referred to in Article 1 (3) of this Directive,
- operating instructions, if any.

2. Where the information relating to a particular refrigerating appliance model has been obtained by calculation on the basis of design, and/or extrapolation from other equivalent or similar refrigerating appliances, the documentation should include details of such calculations and/or extrapolations, and of tests undertaken to verify the accuracy of the calculations undertaken (details of mathematical model for calculating performance and of measurements taken to verify this model). It shall also include a list of all other equivalent or similar refrigerating appliance models whose information has been obtained on the same basis.

#### *Chapter 4* **Refrigerating appliance classification**

1. The refrigerating appliances covered by this Directive shall be divided into the categories set out in **Annex I**.
2. The energy efficiency ranking and energy efficiency class of a refrigerating appliance shall be as specified in **Annex II**.

#### *Chapter 5* **The Label**

The label referred to in Article 2 (1) of Directive 92/75/EEC shall be as specified in **Annex III** to this Directive. It shall be placed on the outside of the front or top of the appliance, in such a way as to be clearly visible, and not obscured.

#### *Chapter 6* **The Fiche**

The content and format of the fiche referred to in the third indent of Article 2 (1) of Directive 92/75/EEC shall be as specified in **Annex IV** to this Directive.

#### *Chapter 7* **Other communications**

Where the appliances are offered for sale, hire or hire purchase by means of a printed or written communication, or by other means which imply that the potential customer cannot be expected to see the appliance displayed, such as a written offer, a mail order catalogue, advertisements on the Internet or on other electronic media, that communication shall include all the information specified in **Annex V** to this Directive.

*Chapter 8*  
***Free circulation of refrigerating appliances***

Member States shall take all necessary measures to ensure that all suppliers and dealers established in their territory fulfil their obligations under this Directive.

Member States shall allow the circulation of labels, fiches and communications referred to in Chapters 5, 6, and 7 of this Directive no later than [*one year and one day after the entry into force of this directive*].

They shall ensure that all labels, fiches and communications referred to in Chapters 5, 6, and 7 of this Directive comply with the models in Annexes III, IV and V, no later than [*one and a half year after the entry into force of this directive*].

For three months after the entering into force of the provisions in Annex III, Part 1, point b) of this Directive, Member States shall allow the display of labels referred to in Article 5 of this Directive complying with the provisions in Annex III, Part 1, point a).

*Chapter 9*  
***Verification procedure for market surveillance purposes***

Member States shall take all necessary measures to ensure that all suppliers and dealers established in their territory fulfil their obligations under this Directive.

When performing the market surveillance checks referred to in Directive 2005/32/EC, Article 3 (2), Member State authorities shall apply the verification procedure set out in **Annex VI** of this directive.

*Chapter 10*  
***Repeals***

Directives 94/2/EC and 2003/66/EC shall be repealed [one year] after the entry into force of this directive.

*Chapter 11*  
***Revision***

No later than [7] years after entry into force of this Directive the Commission shall review it (including the annexes) in the light of technological progress and present the result of this review to the Committee set up under Article 10 of Directive 92/75/EEC.

*Chapter 12*  
***Adoption***

Member States shall adopt and publish the provisions to comply with this Directive no later than [*one year after the entry into force of this directive*]. They shall immediately inform the Commission thereof.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

*Chapter 13*  
*Entry into force*

This Directive shall enter into force on the 20th day following that of its publication in the *Official Journal of the European Union*.

*Chapter 14*  
*Addressee*

This Directive is addressed to the Member States.

Done at Brussels,

## ANNEX I

### Additional applicable definitions and refrigerating appliances classification

#### **1. Additional applicable definitions**

a) Compartments and sections in refrigerating appliances are:

- a.1) “Fresh-food storage compartment” means a compartment intended for the storage of unfrozen foodstuffs, which may itself be divided into sub-compartments.
- a.2) “Cellar compartment” means a compartment intended for the storage of particular foodstuffs or beverages at a temperature warmer than that of the fresh-food storage compartment.
- a.3) “Chill compartment” means a compartment intended specifically for the storage of highly perishable foodstuffs.
- a.4) “Ice-making compartment” means a low-temperature compartment intended specifically for the freezing and storage of ice.
- a.5) “Frozen-food storage compartment” means a low-temperature compartment intended specifically for the storage of frozen foodstuffs. Frozen-food storage compartments are classified according to temperature in:
  - “One-star compartment”: a frozen-food storage compartment in which the temperature is not warmer than - 6 °C;
  - “Two-star compartment”: a frozen-food storage compartment in which the temperature is not warmer than - 12 °C;
  - “Three-star compartment”: a frozen-food storage compartment in which the temperature is not warmer than - 18 °C;
  - “Food freezer compartment” (named also “four-star compartment”): a compartment suitable for freezing foodstuffs from ambient temperature down to -18°C, and which is also suitable for the storage of frozen food under three-star storage conditions. Two-star sections are permitted within the compartment; the rated freezing capacity shall be at least 4,5 kg per 100 l of its storage volume in 24 h, and in no case less than 2 kg;
  - “0-star compartment”: a frozen-food storage compartment in which the temperature is <0°C and that can be used also for the freezing and storage of ice but it is not intended for the storage of highly perishable foodstuffs.
- a.6) “Wine storage compartment”: means a compartment exclusively designed for long term storage of wine. It has to be designed for:
  - (i) the capability of maintaining continuously a nominal temperature in the range from +9 °C to +15 °C with cooling as well as heating;
  - (ii) the capability of maintaining the storage temperature within a variation over time of less than 0,5 K
  - (iii) the active or passive control of the compartment humidity in the range 50-80%;
  - (iv) a construction to reduce the transmission of vibration to the compartment, whether from the refrigerator compressor or from external source.
- a.7) “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 a user

to maintain continuously the operating temperature range applicable to each compartment type according to the manufacturer instructions.

Where a feature shifts temperatures in a compartment to a different operating temperature range for a period of limited duration only (i.e. the feature does not maintain the alternative temperature range continuously, e.g. a fast freeze facility) that feature does not qualify the compartment as multi-use.

b) “Convenience feature” means an enclosure, or a container either fixed or removable by the user in which suitable storage conditions are provided for designated types of foodstuffs. These conditions may be different from those of the compartment in which it is located. A fixed convenience feature is one which is not intended to be removed and its removal is likely to require the use of tools.

c) Where a refrigerating appliance has both “chest” and “upright” configurations, it shall be classified as a chest where the gross volume of the chest component(s) exceeds [75%] of the total gross volume.

d) “Fast freeze” means a reversible feature or a function to be activated by the user according to the manufacturers instructions, that decreases the storage temperature of the freezer or the freezer compartment to achieve a faster freezing of unfrozen foodstuffs or to assist the freezing of large loads of unfrozen foodstuffs.

## 2. Refrigerating appliance classification

Refrigerating appliances are classified in ten categories as shown in Table 1. Each category is defined by the specific compartment composition in Table 2 and is independent from the number of doors, external drawers and compartments. An external drawer is equivalent to a door.

Table 1: Refrigerating appliances categories

Category	Description
1	Refrigerator without other compartments
2	Refrigerator-cellar and Cellar
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 cabinet and other appliances

If the compartment(s) temperature does not allow the classification of the appliance in one of the Categories from 1 to 9, or in case of multi-use cabinets Category 10 can be selected.

Table 2: Refrigerating appliance classification and relevant compartment composition

Storage temperature range (°C)	> +14	± 0,5K <sup>a</sup>	+14 / +8	+8 / +3	+3 / -2 °C	< 0 / > -6	< -6	< -12	< -18	< -18	Category (number)
Nominal temperature (for the EEI) (°C)	design T	design T (+15 /+9)	+12	+5	0	0	-6	-12	-18	-18	
Compartments types	Other <sup>c</sup>	Wine storage	Cellar	Refrigerator	Chill	0star/ Ice making	1 star	2 star	3 star	4 star	
<b>Appliance Category</b>	<b>Compartments composition</b>										
REFRIGERATOR WITHOUT OTHER COMPARTMENTS	N	N	N	<b>Y</b>	N	N	N	N	N	N	<b>1</b>
REFRIGERATOR-CELLAR and CELLAR	O	O	<b>Y</b>	<b>Y</b>	N	N	N	N	N	N	<b>2</b>
	O	O	<b>Y</b>	N	<b>Y</b>	N	N	N	N	N	
	O	<b>Y</b>	N	<b>Y</b>	N	N	N	N	N	N	
REFRIGERATOR-CHILLER and REFRIGERATOR WITH A 0 STAR LOW COMPARTMENT	O	O	O	<b>Y</b>	<b>Y</b>	O	N	N	N	N	<b>3</b>
	O	O	O	<b>Y</b>	O	<b>Y</b>	N	N	N	N	
REFRIGERATOR WITH A 1 STAR COMPARTMENT	O	O	O	<b>Y</b>	O	O	<b>Y</b>	N	N	N	<b>4</b>
REFRIGERATOR WITH A 2 STAR COMPARTMENT	O	O	O	<b>Y</b>	O	O	O	<b>Y</b>	N	N	<b>5</b>
REFRIGERATOR WITH A 3 STAR COMPARTMENT	O	O	O	<b>Y</b>	O	O	O	O	<b>Y</b>	N	<b>6</b>
REFRIGERATOR-FREEZER	O	O	O	<b>Y</b>	O	O	O	O	O	<b>Y</b>	<b>7</b>
UPRIGHT FREEZER	N	N	N	N	N	N	N	O	( <b>Y</b> ) <sup>b</sup>	<b>Y</b>	<b>8</b>
CHEST FREEZER	N	N	N	N	N	N	N	O	N	<b>Y</b>	<b>9</b>
MULTI-USE AND OTHER APPLIANCES	O	O	O	O	O	O	O	O	O	O	<b>10</b>

Notes:

Y = the compartment shall be present;

N = the compartment shall not be present;

O = the compartment presence is optional;

a) the range of the storage temperature for wine storage compartments is ± 0,5K of the nominal temperature, to be included in the range +15/+9;

b) includes also the three-star frozen food cabinets;

c) “Other compartment” includes any compartment, other than a wine storage one, with a storage temperature higher than 14°C

## ANNEX II

### Energy efficiency ranking and energy efficiency class of a refrigerating appliance

The energy efficiency ranking and the energy efficiency classes of a refrigerating appliance shall be determined in accordance with its Energy Efficiency Index as in the following Table 3.

Table 3: Energy efficiency ranking and energy efficiency class of a refrigerating appliance

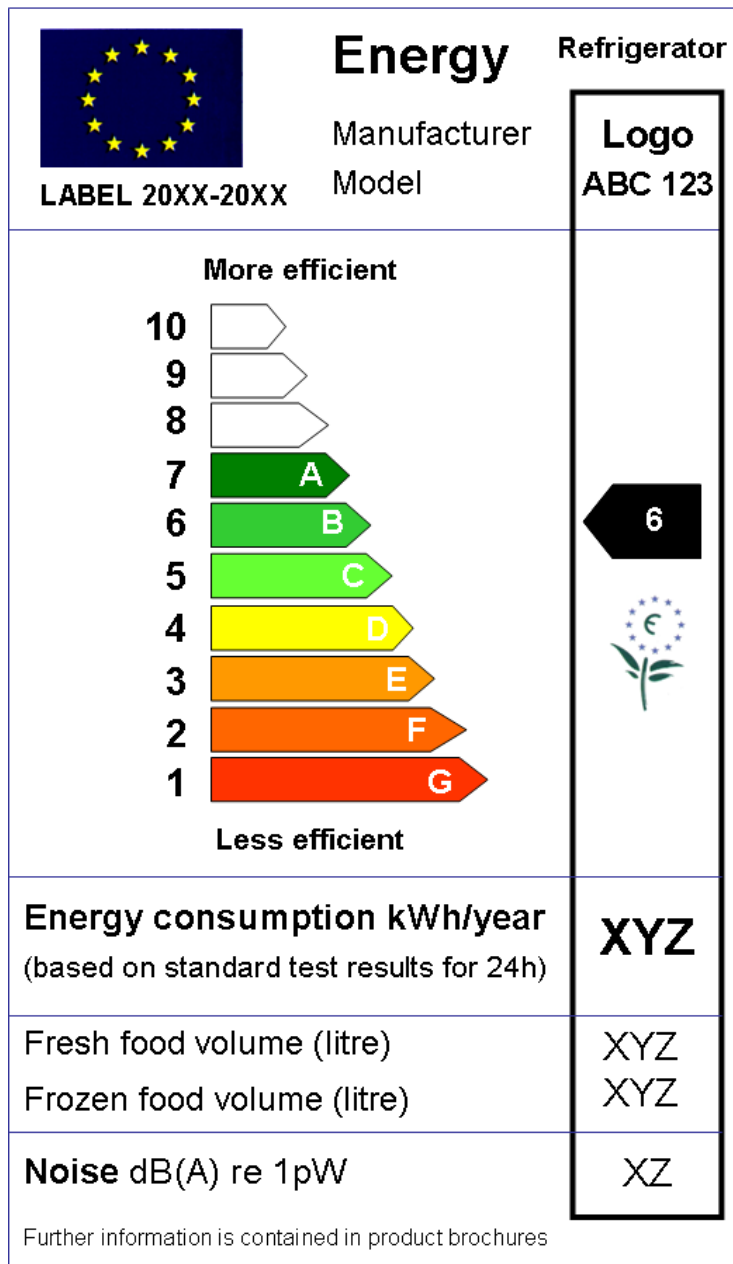
Energy Efficiency Ranking	Energy Efficiency Index	Energy Efficiency Cass	
		Step 1	Step 2
10	$EEI < 15$	--	--
9	$15 \leq EEI < 18$	--	--
8	$18 \leq EEI < 22$	--	A
7	$22 \leq EEI < 28$	A	B
6	$28 \leq EEI < 35$	B	C
5	$35 \leq EEI < 44$	C	D
4	$44 \leq EEI < 55$	D	E
3	$55 \leq EEI < 75$	E	F
2	$75 \leq EEI < 100$	F	G
1	$EEI \geq 100$	G	--

The Energy Efficiency Index (EEI) of a refrigerating appliance shall be determined in accordance with Annex VII.

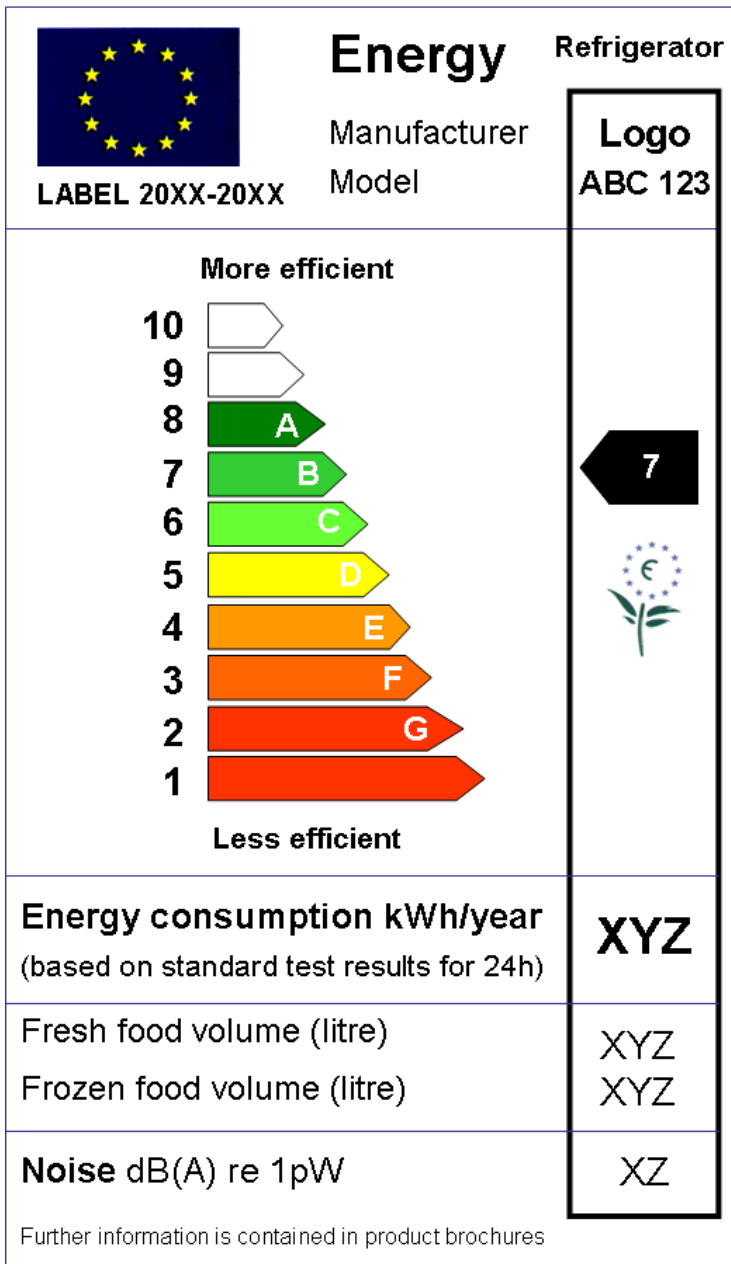
**ANNEX III**  
**The Label**

**1. Label layout and timing**

a) Step one: one year after the entry into force of this directive the label shall be in accordance with the following illustration:



b) Step 2: [Six] years after the entry into force of this directive the label shall be in accordance with the following illustration:



## 2. Notes on label

The following information shall be included in the label:

- I. Supplier's name or trade mark.
- II. Suppliers model identifier.

III. Period of the validity of the label, expressed as an interval in the range ‘year of beginning’ and ‘year of expiring’ for the two Steps described in Annex III, Part 1.

IV. The energy efficiency ranking of the refrigerating appliance, determined in accordance with Annex II, Table 3. The arrow shall be placed at the same level as the relevant energy efficiency ranking and shall show the same number.

V. Without prejudice to any requirements under the Community Eco-label award scheme, where an appliance has been granted a ‘Community Eco-label award’ pursuant to Council Regulation (EEC) No 880/92<sup>3</sup> a copy of the Eco-award mark (the flower) may be added here.

VI. Energy consumption in accordance with standards referred to in Chapter 1 (3) but expressed as Annual Energy Consumption (AC) as described in Annex VII, Part 2, in kWh per year, rounded to the first integer.

VII. Sum of storage volume of all compartments that do not merit a star rating (i.e. operating temperature  $> -6$  °C).

VIII. Sum of storage volume of all frozen food storage compartments which merit a star rating (i.e. operating temperature  $\leq -6$  °C).

IX. Noise, measured in accordance with standards referred to in Chapter 1 (3) of this directive, expressed in dB(A) re1 pW, rounded to the integer;

### **3. Printing**

The following defines certain aspects of the label.

*<to be added>*

### **4. Exemptions**

Parts 1 to 3 of this Annex shall not apply to wine storage appliances.

Parts 1 to 3 of this Annex shall apply to refrigerating appliances that are not specifically designed for wine storage but that may be nevertheless used for this purpose and to refrigerating appliances that have a wine storage compartment combined with any other compartment type.

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<sup>3</sup> O.J. ....

**ANNEX IV**  
**The Fiche**

The fiche shall contain the following information. The information may be given in the form of a table covering a number of refrigerating appliances supplied by the same supplier, in which case it shall be given in the order specified, or given in the description of the refrigerating appliance:

1. Supplier's name or trade mark.
2. Supplier's model identifier.
3. Category of refrigerating appliance as in Annex I
4. The energy efficiency level of the model as defined in Annex II Table 3, expressed as 'Energy efficiency ranking [*number*] on a scale of 1 (less efficient) to 10 (more efficient) which corresponds to an energy efficiency class of [*letter*] in a scale from G to A in the period [*period of validity of the label*]' according to the two steps in Annex III Part 1.

Where this information is provided in a table this may be expressed by other means provided it is clear that the energy efficiency ranking is from 1 (less efficient) to 10 (more efficient) and the energy efficiency scale is from G to A according to Table 3, in the period [*period of validity of the label*].

5. Where the information is provided in a table, and where some of the appliances listed in the table have been granted a 'Community Eco-label award' under Regulation (EEC) No 880/92, this information may be included here. In this case the row heading shall state 'Community Eco-label award', and the entry shall consist of a copy of the Eco-award mark (the flower). This provision is without prejudice to any requirements under the Community Eco-label award scheme.

6. Energy consumption measured in accordance with standards referred to in Chapter 1 (3), but expressed as Annual Energy Consumption (AC) as described in Annex VII, Part 2, in kWh per year, rounded to the first integer; it shall be described as: 'Energy consumption XYZ kWh per year, based on standard test results for 24 h. Actual energy consumption will depend on how the appliance is used and where it is located.'

7. Storage volume of each compartment and relevant star rating, if any, should be listed, in accordance with standards referred to in Chapter 1 (3).

The necessary extra lines may be added to include the information in respect of these compartments.

Where the design temperature of a compartment or of more than one compartment does not conform to the standards referred to in Chapter 1 (3) and Table 1 of this directive, this design temperature shall also be given.

8. The mention 'no frost' may be included for the relevant compartment(s), when in accordance with the definitions given in the standards referred to in Chapter 1 (3).

9. 'Power cut safe Z h' defined as 'temperature rise time' in accordance with standards referred to in Chapter 1 (3).

10. 'Freezing capacity' in kg/24 h in accordance with standards referred to in Article 1 (3).

11. 'Climate class' in accordance with the standards referred to in Chapter 1 (3), and expressed as 'Climatic class: W [*climatic class*]. This appliance is intended to be used at an ambient temperature between X [*lowest temperature*] °C and Y [*highest temperature*] °C.

12. Indications about the combination of drawers, baskets and shelves giving the best appliance energy efficiency.

13. Noise, measured in accordance with standards referred to in Chapter 1 (3) of this directive and expressed in dB(A) re1 pW, rounded to the integer.

14. If the model is produced in order to be built-in, this should be stated.

The information contained in the fiche may be given in the form of a copy of the label, either in colour or in black and white. In this case the further information given only in the fiche must still be included.

This Annex shall not apply to wine storage appliances.

This Annex shall apply to refrigerating appliances that are not specifically designed for wine storage but that may be nevertheless used for this purpose and to refrigerating appliances that have a wine storage compartment combined with any other compartment type.

**ANNEX V**  
**Other communications**

Mail order catalogues and other printed communications referred to by Chapter 6 of this Directive shall contain the following information, given in the order specified:

1. Energy Efficiency Ranking of the model as defined in Annex II.
2. Energy consumption (Annex IV, point 6)
3. Storage volume of each compartment (Annex IV, point 7)
4. Star rating of frozen food compartments (Annex IV, point 7)
5. The capability for refrigerating appliances to be used at cool ambient temperature (Annex IV, point 12)
6. Noise (Annex IV, point 13)
7. If the model is produced in order to be built-in, this should be stated.
8. For wine storage appliances the information from 1 to 6 shall be substituted by the following sentence: 'This appliance is intended to be used exclusively for the long term storage and the aging of wine'.

Point 8 shall not apply to refrigerating appliances that are not specifically designed for wine storage but that may be nevertheless used for this purposes and to refrigerating appliances that have a wine storage compartment combined with any other compartment type.

Where other information contained in the product information fiche is provided, it shall be in the form defined in Annex IV and shall be included in the above list in the order specified for the fiche.

The size and font, in which all the information referred in this Annex is printed, shall be legible.

**ANNEX VI**  
**Verification procedure for market surveillance purposes**

In addition to the procedure laid down in the standards referred to in Article 1 (3) of this Directive, when performing the market surveillance checks for the energy consumption of refrigerating appliances the authorities of the Member States shall apply the following verification procedure, until a suitable harmonised standard is published for the purpose of this Annex.

Member State authorities shall test one single unit.

**1 Energy consumption**

The value measured shall not be greater than the rated value by more than 10 %. If the result of the test carried out on the first refrigerating appliance is greater than the rated value plus 10 %, the test shall be carried out on a further three randomly selected refrigerating appliances. The arithmetical mean of the values of these three refrigerating appliances shall not be greater than the rated value by more than 10 %.

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

**2 Freezing capacity**

The value measured on the first refrigerating appliance tested shall not be less than the rated value by more than 10 %. If the result of the test carried out on the first refrigerating appliance is less than the rated value minus 10 %, the test shall be carried out on a further three randomly selected refrigerating appliances. The arithmetical mean of the values of these three refrigerating appliances shall not be less than the rated value by more than 10 %.

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

**3 Wine storage appliances**

For wine storage appliances evidence shall be provided that the appliance complies with the technical characteristics described in Annex I point a.2, which grant the exemption from the provisions in Annexes III and IV.

## ANNEX VII

### Method for calculating the Energy Efficiency Index of refrigerating appliances

The energy consumption of a refrigerating appliance is a function of the category of appliance to which it belongs, its volume and the construction characteristics (thickness of insulation, compressor efficiency, defrosting characteristics, etc.) and the climate class under which it is deemed to operate.

Allowances must be made for the main endogenous factors which influence energy consumption. For this reason the energy consumption is defined by a linear equation which is a function of the volume of the appliance, with different equations laid down for each category of appliance. To calculate the maximum allowable EEI of a given appliance, it must therefore first be allocated to the appropriate Category.

The Energy Efficiency Index of a refrigerating appliance is then the ratio between its estimated annual energy consumption and the standard annual energy consumption, which is considered the reference or base energy consumption of refrigerating appliances.

#### **1. Calculation of the Equivalent Volume**

Because refrigerating appliances contain different compartments maintained at different temperatures which have a significant influence of the overall energy consumption, the maximum allowable EEI is defined as a function of the Equivalent Volume, which is the weighted sum of the storage volumes of the different compartments.

The equivalent volume of a compartment is the net storage volume of the compartment adjusted to compensate for heat loadings on spaces which are at temperatures other than that of fresh food compartment. The equivalent volume of a refrigerating appliance is the sum of the equivalent volumes of all compartments.

To determine the equivalent volume of a compartment, the volume correction factors shall first be determined as follows:

- The thermodynamic correction factor  $\frac{(25 - T_c)}{20}$  is the temperature difference between the nominal temperature of a compartment (in Table 2) and the ambient temperature under standard test conditions (+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 Table 2 are as in following Table 4.

Table 4: Thermodynamic factors for refrigerating appliance compartments

Compartment	Nominal temperature	$(25-T_c)/20$
Wine storage compartment/Other compartment	design temperature	$\frac{(25 - T_c)}{20}$
Cellar 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 wine storage compartments the thermodynamic factor shall be determined by the coldest nominal temperature, included in the relevant temperature range, capable of being set by a user and maintained continuously according to the manufacturer instructions;
- (ii) for multi-use compartments, the thermodynamic factor shall be determined by the warmest temperature of the coldest storage temperature range for the cabinet or compartment capable of being set by a user and maintained continuously according to the manufacturer instructions;
- (iii) for any two-star section (within a freezer) the thermodynamic factor shall be determined considering a temperature of -12 °C.
- (iv) for other compartments the thermodynamic factor shall be determined by the coldest nominal temperature capable of being set by a user and maintained continuously according to the manufacturer instructions;
- (v) star rating of frozen food storage compartment or compartments, in accordance with standards referred to in Article 1 (3).

- *FF*: is the volume correction factor for the presence of a ‘no frost’ function (Table 5);
- *BI*: is the volume correction factor for built in appliances (Table 5);
- *TD*: is the volume correction factor for the transparent door (Table 5).

Table 5: Value of the correction factors

Correction factor	Value	Conditions
FF (Frost-free)	1,2	for Frost-free (ventilated) frozen food 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 of under 58 cm in width
	1	otherwise
TD (transparent door)	1,05	for compartments having a door with a free transparent area $\geq 90\%$ of their access opening
	1	otherwise

The refrigerating appliance equivalent volume, in litre and recorded to the first integer, is then calculated as:

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

Where

- $n$  is the number of compartments,
- $T_c$  is the nominal temperature of the compartment in Table 2.

## 2. Calculation of the Energy Efficiency Index

For the calculation of the EEI, the energy consumption of any given appliance is compared to the reference energy consumption of the same category of appliance with an identical equivalent volume.

The Energy Efficiency Index is calculated as:

$$EEI = \frac{AC}{SC} \times 100 \quad \text{and is rounded to the first decimal place,}$$

where:

- $AC$  = annual energy consumption of the refrigerating appliance
- $SC$  = standard annual energy consumption of the refrigerating appliance.

The Annual Energy Consumption  $AC$  of a refrigerating appliance is calculated, in kWh/year and recorded three decimal places, as:

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

where  $E_{24h}$  is the energy consumption of the refrigerating appliance in kWh/24h and recorded to three decimal places.

The Standard Annual Energy Consumption  $SC$  of a refrigerating appliance is calculated, in kWh/year and recorded to three decimal places, as:

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

where

- $V_{eq}$  is the equivalent volume of the refrigerating appliance
- $CH$  is an allowance equal to 50 kWh/year given to appliances with a chill compartment of at least 15 litres
- $M$  and  $N$  values depend from the appliance category as in following Table 6.

Table 6: M and N values by appliance category

<b>Category</b>	<b>M</b>	<b>N</b>
<b>1</b>	0,233	245
<b>2</b>	0,233	245
<b>3</b>	0,233	245
<b>4</b>	0,643	191
<b>5</b>	0,450	245
<b>6</b>	0,777	303
<b>7</b>	0,777	303
<b>8</b>	0,539	315
<b>9</b>	0,472	286
<b>10</b>	a	a

<sup>a</sup>for Category 10 refrigerating appliances the M and N values depend on the temperature and the star rating of the compartment with the lowest storage temperature capable of being set by a user and maintained continuously according to the manufacturer instructions. When only other compartment as defined in Table 2 is present, M and N values for Category 1 shall apply