Product Definition

Technology: Domestic refrigerated appliances

Sub Category: Refrigerators, refrigerator-freezers and freezers

1. Summary Definition and Categorisation

This document seeks to define the product definition and categorisation to be used by the 4E Mapping and Benchmarking Annex when analysing Domestic Refrigerated Appliances.

The definition and categorisation for the product is shown in Table 1. Section 2 contains the rationale for the product Categorisation. Section 3 explains the performance metrics to be used in the comparison of products. Section 4 examines the segmentation to be used in identifying best in class units. Section 5 lists the data that will be requested on the basis of the foregoing analysis.

Table 1: Simplified Product Categorisation Matrix

Definition and Scope	A machine that is primarily designed to store, and in some cases chill or freezer, food based products at set temperatures which are normally different to the ambient prevailing conditions. The machine may be constructed with one or more storage compartments which may or may not operated at different temperatures.
	
	Products will be analysed based on the following groupings:
	
	• **Refrigerator only and refrigerators with freezer compartments**. The primary compartment is for fresh storage in the temperature range 5^{o}C >= T> 0^{o}C and
	    ○ The unit has no freezer compartment, or
	    ○ The unit has a freezer compartment of any temperature rating but a volume of less than 14 litres, or
	    ○ The unit has a frozen food compartment of any volume that is rated as 0^{o}C >= T > -15^{o}C
	• **Refrigerator/Freezer combination:** The primary compartment for fresh storage in the temperature range 5^{o}C >= T> 0^{o}C, and the primary frozen food compartment is greater than 14 litres and has a rated temperature T <= -15^{o}C
	• **Freezer only:** A unit where all compartments have a temperature rating T <= -15^{o}C
	
	Chiller units (where primary compartment temperatures are above 5^{o}C) are excluded.
	
	The products will be restricted to vapour compression units only, designed for use in residences and non-portable (in general use), and be designed to run of the normal AC electrical supply.

Other Characteristics to be Noted/ Analysed	Product configuration (refrigerator/freezer combinations with the freezer compartment located above, below and by the side of the fresh food compartment; and upright and chest freezers). Climate class/non-standard external test temperatures. “Built-in” units, defrost type, ice making capability and, potentially, drinks cooling facilities.

2. Product Definition, Scope and Sub-Category Rationalisation

This section explains the rationale behind the summary definition and product categorisation presented in Section 1.

2.1 Product Definition

Although the specific wordings of definitions vary significantly, it appears that the following generic definition is appropriate to capture the basic definition of a refrigerated appliance:

> *"A machine that is primarily designed to store, and in some cases chill or freezer, food based products at set temperatures which are normally different to the ambient prevailing conditions. The machine may be constructed with one or more storage compartments which may or may not operated at different temperatures"*

However, while this definition is appropriate as generic descriptor of refrigerated appliances, it is very broad and for the purposes of the 4E Mapping and Benchmarking Annex analysis, must be viewed within the context of the further limitations/clarifications provided in section 2.2.

2.2 Product Sub-categorisation

Table 2 provides details of the possible product categories. Sections 2.2.1 provides a discussion on each category and the resulting product segmentation to be used in the Mapping and Benchmarking Analysis.

Table 2: Initial matrix definition of possible refrigerated appliance categorisations.

	Aspect	*Possible Permutations*
A	Applications	Domestic, commercial, mobile, other
B	Power supply	Supply voltage and frequency variations
C	Cooling Driver	Vapour compression, absorption, other
D	Compartment Type(s), Temperature and Humidity	Cellar, Fresh, Vegetable/Fruit, Chill, Frozen and other defined compartment types and associated temperature and humidity specifications
E	Unit Type	Chiller, refrigerator, freezer or combination appliance
F	Cooling Type	Forced Air or Natural Convection
G	Product Dimensions/ Configuration	Overall footprint and height, individual compartment volumes and relative configuration, and whether the unit has specific design to function as a "built-in" unit
H	Climate Class	Functionality/design to non-standard testing conditions
I	Temperature Control	Single or multiple compartment temperature control capability
J	Defrost Type	Manual, cyclical or on demand automatic defrost of some or all compartments
K	Anti-condensate capability	Whether panels have anti-condensate heaters installed
L	Ice Making Capability	Specific functionality to produce ice, and whether internal or through door capability
M	Drinks Cooling	Specific functionality to provide through the door drinks cooling
O	IT Functions	Presence of display screen, scanning or internet connection capability

2.2.1. Proposed Appliance Categorisation

Matrix Row A): Application: Domestic, commercial, mobile, other

The majority of regulations seem to use a combination of one or more of the following to define a "domestic" refrigerated appliance: defining that the *primary* purpose of the unit is chilling, refrigerating and/or freezing of a food in a domestic environment; defining a minimum and/or maximum capacity; the unit not being specifically designed for a boat, plane or other mobile vehicle and nor to be mobile within a residence; and/or the unit be powered by mains electricity. However, for practical purposes, despite the variations in definition, it appears the definitions are broadly similar. The possible exception is the definition of maximum volume. For example, in Canada/USA, the “domestic” refrigerator is designated as a unit where the total volume of all compartments is no more than 1,104 litres, while in EU countries this maximum volume is 1,500 litres.

Proposal: For practical purposes, the data supplied to the Mapping and Benchmarking Annex will almost certainly be limited to that obtained under the local definition of “domestic” refrigerated appliance, with insufficient model specific data to enable further filtering to reach a truly generic definition. Therefore, it is proposed that “domestic” refrigerated appliances will be defined as all units where the primary purpose is to deliver chilling, refrigerating and/or freezing of food based products for non-professional use. The products will be designed for use in residences and non-portable (in general use), and be designed to run of the normal AC electrical supply. However, it is accepted that there may be small variations in scope between data from each country. No maximum volume will be specified, however compartment volume data will be captured in the data collection process, and should this appear to be inappropriately biasing results, a maximum value will be applied to all countries if possible.

Post Data Collection Addendum: Following data collection is appears that an upper limit need not be applied as, even in countries with relatively large units, the average total volumes are approximately 600 litres, with number of products and sales of significantly larger units (eg those over 1,000 litres) being so low as to be irrelevant to the analysis.

Matrix Row B): Power Supply: Supply voltage and frequency variations

Data is likely to be sourced from countries with 110V 60Hz and 220/240V 50Hz supplies. This would clearly have an impact on energy consumption if units are designed to run on either supply system. However, there are almost no multi-voltage refrigerator systems on sale.

Proposal: As the compressions/drive systems (and other functionality) of units will have been optimised to local supply conditions, and as such will variation in supply voltage and frequency will have almost no impact on the comparative efficiency of products, the supply voltage and frequency will not be considered as a factor in the comparison of products.

Matrix Row C): Cooling Driver: Vapour compression, absorption, other

While not universal in application, especially in off-grid and mobile applications, the vast majority of products falling under the definition of “domestic” refrigerated products operate using the vapour compression cycle. Further, most national regulations specify vapour compression units to be the only products considered in regulations.

Proposal: Analyse only vapour compression units.

Matrix Row D): Compartment type(s) and temperatures/humidity: Cellar, Fresh, Vegetable/Fruit, Chill Frozen and other defined compartment types and associated temperature and humidity specifications

Differences in the temperature of individual refrigerated storage compartments are one of the primary drivers for differences in energy consumption. Historical national developments have led to differences in regulatory definitions for types of compartment and the associated temperatures of these compartments, often varying quite significantly between countries. Further, the specific functionality of a compartment may vary with an associated energy penalty (in particular where a “frozen” compartment is designed simply to hold the temperature of items placed within the compartment, or to “pull-down” the items from a higher temperature to the specified temperature of the compartment). However, in *almost* all situations, the specific compartment temperatures (and the functionality to “pull-down” items) are well defined; test procedures very specific, and declarations transparent. Thus, as the normalisation of unit energy consumption will have to take account of compartment temperature variations, it is possible to define a generic range of compartment temperatures, with normalisation of the units’ declared energy consumption based on the specific temperature of the compartments within the unit relative to the generic temperature ranges.

The two primary problems with this approach are:

1) No account is taken for humidity: Some products have functionality to maintain specific humidity conditions within some compartments (eg for the storage of fruit and vegetables). There is an energy penalty (ie more energy is used) in maintaining these specific humidity conditions within a whole compartment, or with a specific area within a compartment. However, the specific energy penalty is very difficult to qualify and the data available to the Annex does not allow identification of the specific variations in humidity in (and within) compartments.

2) Multi-temperature compartments: Some products have compartments where temperatures may be varied, in the extreme from the maintenance of fresh food to deep freeze. However, all test methodologies require such "variable temperature" compartments to be set at their lowest design temperature and thus such units can be compared on the basis of this lowest compartment temperature.

Proposal: The compartment temperature bands selected are designed to capture as closely as possible the compartments with similar "generic" definitions across countries (eg compartments with names and related functionality similar to wine cellar, fresh compartment, chiller, …., frozen). To minimise the degree of normalisation required across countries from which data is expected, normalisation of energy consumption will be made based on typical EU compartment temperatures within each band. The temperature value in brackets indicates the specific temperature to which all compartments within a band will be normalised (normalisation will be made to an external unit temperature of 25^{o}C)[1]:

Compartment 1: 14^{O}C>=T>5^{O}C (9.5^{o}C)

Compartment 2: 5^{O}C>=T>=3^{O}C (5^{o}C)

Compartment 3: 3^{O}C>T>-2^{O}C (0^{o}C)

Compartment 4: -2^{O}C>=T>-9^{O}C (-6^{o}C)

Compartment 5: -9^{O}C>=T>-15^{O}C (-12^{o}C)

Compartment 6: T<=-15^{O}C (-18^{o}C)

While recognising the inherent energy penalty in providing management of humidity in some compartments, due to combination of limited in data availability and lack of empirical evidence on the specific impact on individual unit types, no normalisation will be made for functionality to manage unit humidity.

Matrix Row E): Unit Type: Chiller, refrigerator, freezer or combination appliance

As noted in the descriptor for "Matrix Row D" above, there are significant variations in compartment type and temperature, with an individual appliance having one or more of these compartments combined into a model. Hence, the potential number of compartment combinations within any particular model is high. However, most regulatory regimes attempt to capture the typical combinations of compartments into groups for regulatory purposes (while additional mechanisms to capture less usual combinations). The number and scope of these groupings vary significantly between countries, but may broadly be defined by the *primary* functionality of:

- Units for chilling only where the (eg wine chillers);
- Units for refrigeration only (ie devices where the designed almost exclusively for storage of fresh food or similar – in the US these units are known as "all refrigerators");
- Units for refrigeration with some freezer storage capacity (ie units where units have both refrigeration compartment(s), and compartment(s) to store food below 0^{o}C, although typically not the capacity "pull-down" the food to this temperature;
- Combination Refrigerator/Freezer Units (ie where units have both refrigeration compartment(s), and compartment(s) that are designed to store food, normally at temperatures of -15^{o}C or lower, and with the capacity to pull-down the food from ambient temperature to this frozen temperature);
- Units for Freezing only (ie units that are designed to store food, normally at temperatures of -15^{o}C or lower, and with the capacity to pull-down the food from ambient temperature to this frozen temperature).

Proposal: For the practical purpose of minimising the number of product combination, and to enable the comparison of products that are defined slightly differently between various regulatory regimes, it is proposed that products will be analysed based on the following groupings:

- ***Refrigerator only and refrigerators with freezer compartments****. The primary compartment is for fresh storage in the temperature range 5^{o}C >= T> 0^{o}C and*
    - *The unit has no freezer compartment, or*
    - *The unit has a freezer compartment of any temperature rating but a volume of less than 14 litres, or*
    - *The unit has a frozen food compartment of any volume that is rated as 0^{o}C >= T > -15^{o}C.*

[1] The approach to normalisation of energy for temperature variation is detailed in *Domestic Refrigerated Appliances - Summary of Approach to the Analysis - IEA 4e* available at: http://mappingandbenchmarking.iea-4e.org/matrix?type=product&id=13

- ***Refrigerator/Freezer combination:*** *The primary compartment for fresh storage in the temperature range 5^oC >= T> 0^oC, and the primary frozen food compartment is greater than 14 litres and has a rated temperature T <= -15^oC*
- ***Freezer only:*** *A unit where all compartments have a temperature rating T <= -15^oC*

Note that this classification does not differentiate between freezer units with the capacity to "pull down" food to the required frozen temperature rather than simply store the food at that frozen temperature. This is a practical decision based on the data sets available not having any indication of whether units have such functionality or not. However, indications are that in recent years (where accurate comparison is most important for policy makers), almost all units with freezer compartments below -15^oC have the capacity to "pull down" the food to this temperature, while units with freezer compartments of temperatures 0^oC >= T > -15^oC do not. Hence the proposed separation on units with freezers above and below -15^oC.

Chiller units are not to be included in the analysis as they represent very small shares of the markets in the majority of countries being analysed.

Matrix Row F): Cooling Type: Forced Air or Natural Convection

There are a variety of mechanisms for cooling the (normally) fresh food compartment, primarily through some system of natural convection or through forcing cooler air from the freezer compartment. The energy impact of the particular cooling mechanism employed is model specific. As the impact is so variable at the model level, limited empirical evidence exists on how it may be possible to estimate the specific impact of the cooling mechanism in a given circumstance. However, from the user point of view, the units can be considered functionally identical. In such cases of functional equality, the Annex considers units should be compared without normalisation for that issue.

Proposal: No normalisations will be undertaken for cooling type. However, where data is available at the model level, attempts will be made to capture the cooling type during the data gathering phase. This data may allow further analysis of the link between energy consumption and cooling type should that be considered of value, but will not be undertaken as a core element of the benchmarking process.

Post Data Collection Addendum: No datasets available contained information on the cooling type of the unit and this no analysis was possible.

Matrix Row G): Product Dimensions/Configuration: Overall footprint and height, individual compartment volumes and relative configuration, and whether the unit has specific design to function as a "built-in" unit

The overall footprint (base width and depth) and height of the unit have an impact on energy consumption as they affect the ratio of the unit's volume to surface, and hence the proportionate rate of heat loss from the unit. Historically, models have tended to have footprints based on standard US and European appliance footprints (64" x 64" and 560mm x 560mm respectively) with heights broadly defined by the unit capacity. Hence, units with the US based footprints would inherently be slightly more efficient for a given configuration and construction. However, more recently, unit sizes have become much more variable, particularly with the recent significant penetration into many markets of side-by-side refrigerator/freezer combination units. Further, in order to perform analysis that accounts for the relative heat loss of units based on their capacity/surface area, in would be necessary to have data not simply on the overall surface area, but also the specific surface area for individual compartments operating at different internal temperature, and in no cases is this information in not available for the analysis.

The relative size and configurations of compartment, and the differences in temperatures of compartments within a unit, can have significant impact on the overall energy performance of units. For example, a refrigerator freezer combination unit of two compartments of given volumes and similar construction will consumer least energy if the freezer compartment is positioned above the fresh food compartment, and most energy if the freezer compartment positioned by the side of the fresh compartment. Similarly, typically chest freezers consume less energy that upright freezers of the same volume. Normally this variation would be ignored by the Annex as the policy is to focus on functionality rather that unit construction (in this case the ability of the unit to provide cooling rather than configuration of compartments). However, the "consumer experience" of various configurations is significant different and consequently regulatory regimes in some countries are defined by such configuration differences and the markets have fragmented by these product types.

Units that are specifically designed to be "built-in" to (typically) specialist kitchen installations are often designed such that facias, door opening systems, etc, can be attached directly to the unit. Built-in units, once installed, also typically have less air flow around the unit especially the condenser, hence suffer associated energy penalties. However, most test methodologies are amended to facilitate appropriate testing of such units, and regulatory regimes normally have some additional energy allowances for models designed in this way.

Proposal:

Product Dimensions: The combination of the Annex policy to focus on functionality rather that unit construction, and the practical fact that few of the available data sets have information on product dimensions, particularly the surface area of individual compartments of differing temperatures, product dimensions will not be considered during the analysis.

Product Configurations: As the Annex policy is to focus on functionality (cooling capability/capacity) rather than product construction, the primary comparison on products will be conducted based on the product groupings defined in Matrix Row E above. However, given the significant variation in consumer experience and regulatory regimes, where information is available, further segmentation will be undertaken to examine refrigerator/freezer combinations with configurations where the freezer compartment is above the fresh food compartment, the freezer compartment is below the fresh food compartment, and the freezer compartment is by the side of the fresh food compartment. Similarly, where information is available, further segmentation will be undertaken to examine upright and chest freezers separately.

Built-in units. Where information is available that identifies a model as being specifically designed to be "built-in", an allowance will be made in the analysis to ensure comparability to account for the associated energy penalty of the built-in arrangement[2].

Matrix Row I): Climate Class: Functionality/design to non-standard testing conditions

Refrigerated appliances are normally optimised to operate at the ambient temperature defined in the test method of the national regulatory regime in which they are to be placed on sale (eg 25^{o}C in the EU and 32^{o}C in Australia). However, some regulatory regimes allow for units to be tested at other external temperatures (with the various external temperatures often referred to as temperate, sub-tropical or tropical with units classified accordingly). Clearly, the higher the ambient temperature, the more energy will be consumed by a particular model in attaining the specified internal compartment temperatures, and indeed the unit may contain additional design features, eg larger compressors and/or evaporators compared with units designed for standard conditions. Unfortunately, in countries where testing to "non-standard" external conditions is allowed, data sets available do not capture information on which external test temperature was used for the test, therefore it is impossible to normalise for this situation.

Proposal: Given the lack of available data, all units will be considered to have been tested at standard external temperatures defined in the local regulatory framework. Should information become available on the climate class of individual models, normalisation[1] with take account of the different external test temperature will be undertaken, but no additional normalisation will be made for differences in the energy consumption of individual components they may have been changed to accommodate the differing external temperatures.

Matrix Row J): Temperature Control: Single or multiple compartment temperature control capability

Individual models may have user control of the temperature of individual compartments (ie to make an individual compartment warmer or cooler), the temperature of all compartments within the unit as a whole (ie, are able to make compartment temperatures warmer or cooler, but all compartments at once), or some combination. While in use by the consumer increasing the temperature of a compartment will reduce energy consumption and making it cooler will increase energy consumption, under test conditions the ability to control compartment temperature will have no energy impact as compartment temperatures are defined (or appropriate adjustments made to the declared energy consumption).

It should be noted in some regulatory regimes where units are predominantly single temperature control, typically the test requires the unit to have temperature control set such that the freezer compartment meets the target test temperature, with the fresh food compartments allowed to operate within a range rather than a specific temperature.

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[2] The approach to normalisation to account for built in units, units with auto-defrost functionality, etc, is detailed in *Domestic Refrigerated Appliances - Summary of Approach to the Analysis - IEA 4e* available at: http://mappingandbenchmarking.iea-4e.org/matrix?type=product&id=13

Proposal: As the type of temperature control has no impact on consumption under test conditions, no normalisation will be made for the this variable. In regulatory regimes where a range of temperature is allowed for the fresh compartment, the highest allowable compartment temperature will be assumed as the fresh compartment temperature for all units.

Matrix Row K): Defrost Type: Manual, cyclical or on demand automatic defrost of some or all compartments

The type and frequency of defrost cycle has a significant impact on the energy consumption of individual products as, each time a defrost cycle occurs, the unit has re-stabilise at the target compartment temperatures. All test methodologies now capture auto-defrost cycles as these can be considered part of the "normal" operation of the unit. However, typically units with manual defrost do not have the defrost cycle included as part of "normal" energy consumption as the defrost cycle is driven by the consumer and is hence is typically very infrequent.

Proposal: While there is an argument to say auto-defrost units perform the same function as non-auto defrost units (ie cooling), then there should be no allowance made for the differences in defrost types. However, there is a strong argument that the non-frost units actually offer additional functionality for the consumer. Further, auto defrost units also may consume less energy in operation than units that rely on manual defrost and which may become have ice build up impeding efficient operation of the unit. Hence, in line with most regulatory regimes, an allowance will be made during the normalisation/analysis process to account for the "auto-defrost" capability of some units[2].

Matrix Row L): Anti-condensate capability: Whether panels have anti-condensate heaters installed

Most refrigerated appliances no feature some kind of mechanism to limit the formation of condensation on the external walls of the unit. Further, when installed, all regulatory regimes now require this functionality to be enabled during the test and hence any energy consumption of such heaters should be captured in the test.

Proposal: As most refrigerated appliances now feature mechanisms to limit condensate formation, and available data sets do not indicate whether individual models have such functionality, it will be assumed all units have the functionality and no normalisation will be undertaken.

Matrix Row M): Ice Making Capability: Specific functionality to produce ice, and whether internal or through door capability

The facility to produce ice clearly is additional functionality over and above the core function of cooling/maintaining food at a given temperature. Given the objective is ice production, this additional functionality comes with a significant energy penalty (although until very recently, almost all test ignore the actual energy cost of the actual ice making process and simply require the ice maker to be operational, but not making ice which has a relatively marginal impact on overall unit energy consumption[3]). Further, where there is a through the door function, this comes with an additional energy penalty resulting from the reduction of insulation in the area where the ice is delivered through the door – estimated at 5% of total unit energy consumption.

Given the marginal energy penalty associated with the operation of the ice making unit when not producing ice, there appears little need to adjust for this when comparing ice making and non-ice making units., However, when comparing ice making units with through the door service against units with no ice maker/through the door ice service, there is a reasonably strong argument that the units with through the door ice makers should have a proportion of their energy consumption (5%) deducted to account for the loss of energy resulting from the reduced insulation, hence making the units comparable.

Proposal: At the time of preparation of this product definition, it is unclear what proportion of products within the various markets have non-through the door and through the door ice making functionality, and whether such units can be identified in the various data sets. Therefore, functionality will be built into the analysis tools that will allow "correction" for the energy penalty for through the door ice provision should it be considered appropriate and identification of this functionality possible within data sets.

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[3] The most recent US and Canadian regulations, coming into force in 2014, have 84kWh added to the annual energy consumption of unit with ice-makers to account for the energy consumed in the ice making process. However, this will not affect any historic data that will be reported from the benchmarking process.

Matrix Row N): Drinks Cooling: Specific functionality to provide through the door drinks cooling

In a similar way to ice making functionality, the ability to deliver cool drinks through the door of a refrigerated product is additional functionality over and above the core function of cooling/maintaining food at a given temperature. However, unlike the ice-maker there appears to be very little energy penalty associated with this additional service (under test conditions) either from unit functionality or via reduced insulation.

Proposal: Given the apparent margin impact of drinks coolers on overall energy consumption, it is proposed that no account will be taken of this function in comparisons. However, functionality will be built into the analysis tools to allow for corrections should additional information become available that the energy penalty is more than currently anticipated.

Matrix Row O): IT Functions: Presence of display screen, scanning or internet connection capability

A number of refrigerated appliances now have IT functionality such as screen displays, the ability to scan products entering and leaving the unit, and/or internet connectivity to allow remote control of the unit and/or connection to other devices to enable, for example, ordering of food items. However, although increasing in availability, such products still make up very small proportions of the models for sale and a smaller proportion of actual sales. Further, at present, regulatory regimes (and associated data sets) take no account of such functionality.

Proposal: Given the very low market penetration of such units, and the lack of available data, no account will be taken of IT functionality of units. However, given the potential impact of such functionality in the future, where information is found on the impact of IT equipment it will be presented separately.

3. Metrics

The metrics to be used in comparison of products (under test conditions) are:

Energy Consumption: Total Annual Energy Consumption (kWh/year)

Energy Efficiency: Total Energy Consumption per Adjusted Litre Capacity (kWh/adjusted litre)

To enable the comparison of units of significant differing volumes and types, the comparison benchmarking of products will also be made using the Energy Efficiency Index as defined in the EU[4].

The following functionalities that impact on these metrics will also be investigated:

Product configuration (refrigerator/freezer combinations with the freezer compartment located above, below and by the side of the fresh food compartment; and upright and chest freezers).

Climate class/non-standard external test temperatures

“Built-in” units, defrost type, ice making capability and, potentially, drinks cooling facilities

4. Product Segmentation for Identification of Best in Class

Best in class will be based on product type and configuration (defined in matrix rows E and G above). If appropriate, further segmentation will be made based on overall product volumes.

5. Data requirements

To enable the most effective analysis of data and comparison between countries, the following data will be collected where available.

[4] The approach to calculating EU EEI’s is given in *Domestic Refrigerated Appliances - Summary of Approach to the Analysis - IEA 4e* available at:
http://mappingandbenchmarking.iea-4e.org/matrix?type=product&id=13

5.1 Information on new products on sale

The following information is desired for all years available between 1997 and 2011. Ideally this will be in the form of **individual model information** as this will allow additional analysis (eg Best in Class). However it is recognised not all information will be available in all countries and, where individual model information is not available aggregated market data is of value**:**

Brand/Model identifier

Unit type (as defined locally, eg refrigerator, freezer, all refrigerator, etc)

The number, volume and temperature of individual compartments within the unit

Unit configuration (eg freezer compartment above frozen compartment)

Declared Energy Consumption of the unit under test conditions

Defrost type (automatic, partially automatic or manual)

Cooling type (forced air or natural convection)

Temperature control mechanism

Whether the unit is designed for non-standard external temperatures (eg tropical class)

Ice making functionality

Water/Drinks Cooling functionality

IT functionality

5.2 Information on stock and sales

For all years available between 1997 and 2011:

Total national stock of products in service

Estimated total annual energy consumption of units in stock

Estimated average efficiency of stock (Energy Consumption/Adjusted litre)

5.3 Additional Information Required for Data Processing

Test methodology(ies) used to derive the data, and any relationship to known international standards (e.g. EN *XXX*; clone of test method XYZ [with these amendments: A, B and C], etc.)

Regulatory, declaration requirements or other local requirements that affect product performance (eg MEPS, Labelling, etc)

Dates at which any changes to test methods and/or regulatory/declaration requirements occurred during period of reported data.

5.4 Additional Information Required for Other Planned Analysis

Summary of all major policy actions affecting refrigerated applianced over the period data is available including whether voluntary or mandatory, the year when policy was first considered, the year of formal announcement of the policy plans, and the year when the policy came into force.

Summary of any cultural or other issues that are thought to affect this product at the local level.