WORKSHOP ON TESTING METHODS FOR REFRIGERATORS AND FREEZERS

[SUMMARY OF DISCUSSIONS]

On 31st March 2017, CECED and CECED Italia organized a Workshop on testing methods for refrigerators and freezers in the context of the revision of the ecodesign and energy labelling regulations. 73 participants joined the Workshop, representing the EU Commission, consumer associations, environmental NGOs, market surveillance authorities, consultants, several European testing laboratories, as well as CECED direct and non-direct members. The workshop was hosted by IMQ in Milan.

Introduction

Since 2015, CECED has been organising a series of workshops to discuss and reflect on the consumer relevance of current test methods used in standardization for Ecodesign and Energy Labelling requirements. After vacuum cleaners, washing machines and washer-dryers, CECED and CECED Italia decided to repeat this exercise and organised a fourth edition on 31 March 2017, this time dedicated to refrigerators and freezers, in the context of the ongoing revision of the Ecodesign and Energy Label regulations.

The main objective of the workshop was to explain and present the new standard IEC 62552/1,2,3-2015 developed over the last few years and to show practically in a lab how the tests are conducted. Stakeholders were invited to provide feedback on whether the new standard can be considered more consumer relevant than the previous one and to gather input on how it could it be improved in the future.

The workshop took place at IMQ Laboratory in Milan and gathered together 73 participants, coming from the European Commission, Consumer associations, Member States representatives, Members of Standardization Committees, Market Surveillance Authorities, NGOs, Laboratories, External Consultants and manufacturers.

REVISION OF EL AND ED REGULATIONS AND MAIN FINDINGS OF THE PREPARATORY STUDY

Ms Pirchner, the policy officer from the European Commission in charge of the review study of refrigeration appliances started the day by giving the participants an overview of the legislative environment and by presenting the status of the current revision procedure of cold appliance regulations.

Ms Pirchner first informed the audience that, after the final trialogue on 21 March 2017, an agreement had been reached on the text of the future EL framework regulation. The text, likely to be adopted as it is or with no major change, foresees the reintroduction of an energy efficiency scale ranging from A to G that would no longer allow classes with plusses (e.g. A+, A++,…). Any rescaling following the publication of the new framework would have to leave one or two top classes unpopulated in order to leave room for innovation and to make sure that the label would not be obsolete after only a few years. The decision to have one or two empty classes would depend on the technological development of each specific product. For refrigerator and freezer one class will be left empty. Ms Pirchner informed that refrigerators and freezers would follow the fast track rescaling procedure which means that the specific EL regulation should be adopted by the Commission at the latest 15 months after the entry into force of the Energy Labelling Framework Regulation, with the aim of having the rescaled label appear in shops at the latest 12 months after the entry into force of the specific product regulation.

Along with these requirements, the text of the future framework regulation foresees the creation of a public and mandatory database gathering the information on products covered by energy label requirements. Another more detailed database, this time only accessible to Market Surveillance Authorities and Member States, would also be created in order to help authorities to monitor the compliance of the market.

Concerning the revision of the Ecodesign and Energy Labelling regulations of refrigeration appliances, Ms Pirchner informed that the final report of the preparatory study had been published on 4 March 2016. A complimentary study on food waste was made after and recently published (cf. infra).

The Consultation Forum to present and discuss the final draft of the text with all stakeholders is expected to take place in autumn 2017.

Mr Kemna (VHK), the consultant in charge of the preparatory study, then explained the main findings of the study and detailed the points still subject to debate.

He said that between 2005 and 2014, the volume of refrigeration appliances had increased by 11%. The overall energy consumption, however, had been reduced by 20% and even 30% if we look at the kWh/Liter. The average Energy Efficiency Index has also dropped by 30% during these 10 years, which shows a very positive impact of the energy label and efforts made by manufacturers.

However, the progress seems to be stagnating over the last two years which tends to demonstrate the need to revise the energy label.

Concerning the preparatory study and recommendations for the future regulations, there is a consensus among all stakeholders on the following points:

- Agreement on the scope (to include non-household and wine storage for the Ecodesign part)
- The future regulation should be based on the new standard
- The future regulation should avoid text definitions of categories and use compartment definitions and target temperatures as defined in the new standard, which reduces the ambiguity
- The requirements should be based on technical modelling and no longer market statistics
- The correction factor for tropical/sub-tropical should be removed
- The built-in correction factor should be modified
- There should be no correction factor for solid door wine storage
- The frost-free factor should be maintained, but not yet agreement on the value

To sum up, Mr Kemna reported that all agree that the new regulation should help simplifying the ambiguous parts of the current text. Nevertheless, some points, listed here, are still subject to debate:

- The combi-factor in the single formula is still under discussions
- The frost-free compensation value
- The definition of chiller and the compensation factor
- The compensation factor for glass-door wine storage
- The multi door compensation

Mr Kemna ended his presentation stating that today the Best Available Technology (BAT) appliance would be 55% more energy efficient than the current base case, with an EEI of 17. The Least Life Cycle Cost (LLCC) appliance would be 34% more energy efficient than the current base case, with an EEI of 25. The savings that could be made with an appliance using the technology of LLCC would be equivalent to 10TWh for electricity, 3.2MT of CO2 and around 1-1.2 billion € in terms of net consumer expenditure.

The presentation displayed during the workshop is available for reference in Annex 1.

PRESENTATION OF COMPLEMENTARY STUDY ON FOOD PRESERVATION

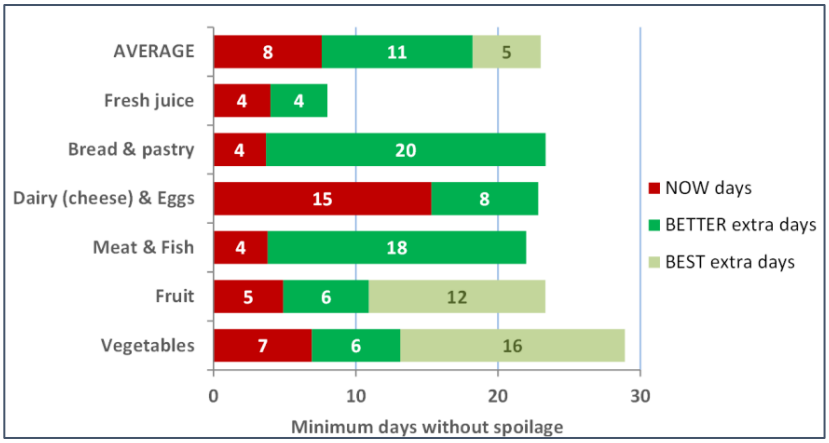
Mr Kemna then presented the outcome of the complementary research study VHK conducted on optimal food storage conditions in refrigeration appliances. He introduced the topic saying that there are some opportunities where refrigeration appliances can make a valuable contribution to fighting food waste, and de facto helping to save energy and resources.

The aim of the study was to explore the storage conditions and analyse how they can be optimized for prolonged food shelf-life. The starting point of the research is that around 20% of EU's domestic material consumption goes into food production. Out of this production, 18% are wasted by private households and food services – of this end use waste, 60% (11% of the total end-use waste) is due to food spoilage and bad planning, thus avoidable.

Following this, Mr Kemna explained that refrigeration appliances store two thirds of the food and drinks prior to consumption and waste disposal. He said that refrigeration appliances can therefore play a major role in preventing food spoilage and could possibly contribute to better planning if they were designed more adequately.

The study then showed that reducing food waste is probably as important as reducing the energy consumption of appliances. Indeed, producing food also requires a lot of energy and resources. The piece of research tends to demonstrate that the energy used to produce food accounts for almost half of the energy consumed during the use phase of all energy related products. Food production also accounts for a very important part of the total EU water use and greenhouse gas emissions in the atmosphere (respectively 27% of water use and 24% of emissions). Finally, savings in terms of money for households could also be significant as they tend to spend four times more on food than on energy and acquisition of appliances. For all these reasons, Mr Kemna insisted on the fact that food waste should be taken into account when consolidating Ecodesign and Energy Labelling regulation. Special attention should be given to find the optimal quantitative balance between avoiding food waste through better refrigeration and the possible increase of energy use of the refrigeration appliances. Stakeholders should keep in mind that 2% food waste reduction is equivalent to 20% refrigerator extra energy use in terms of resources and energy.

Going more in depth into storage conditions, Mr Kemna showed that the minimum number of days without spoiling of aliments can be significantly increased if a fridge is used in an adapted manner. The study says that *"currently, over 85% of refrigeration appliances offer --apart from a freezer compartment-- only a single fresh food compartment at a temperature of +4°C. For about half of the fresh food (and drinks) this is either too warm or too cold for best fresh food preservation. The presence of a chiller (-1°C) and a 'cellar' compartment (8-14°C) could increase the shelf life, in days, with on average a factor 3 or 4. For certain foodstuffs like fresh meat, that required large resources to produce, the shelf life could be prolonged from 3 to 20 days by using a chiller instead of the usual fresh food temperature."* Based on this argument, the study suggests to include a multi-door compensation factor in the ecodesign and energy labelling regulations for household refrigeration appliances.



VHK study, p. 142 - Minimum days without spoilage: NOW – BETTER – BEST storage conditions

The study identified further barriers to the food waste reduction:

First, the consumers misunderstanding of the terms "use by", "best before" and "sell-by". The current use of these terms is based on worst case scenario and is set by suppliers, not by authorities. Second, unlike frozen food, there is no indication for fresh food on how the storage temperature influences the "use by" date. A proposal could be to have different dates for chiller at -1°C versus normal fridges at +4°C.

Finally, around 20% of the volume of the fridge is currently occupied. A better scenario would aim at raising this occupation of the fridge up to 27%.

Mr Kemna concluded by presenting the policy options recommended by the study:

The first recommendation to policy makers is, as mentioned above, to allow multi-door compensation factor in order to, at least, no longer penalize multi-door appliances compared to single-door units. A second recommendation is to better harmonize at EU level the setting of "use by" dates. For example, comparable to today's food labelling for frozen products, the use-by dates could differentiate between storage at +4°C (normal refrigerator) and -1°C.

Finally, the study strongly recommends raising consumer-awareness – *"When linked to proper use of the (relatively new) cold storage facilities and the benefits of not only less food waste but also healthier and tastier food, it is believed that such campaigns could be more successful then campaigns to change wasteful behaviour in general".*

The presentation displayed during the workshop is available for reference in Annex 2. The full VHK study is available for reference in Annex 3.

COMPARISON BETWEEN NEW IEC STANDARD AND CURRENT EN STANDARD

The floor was then given to Mr Haerlen (Chairman CLC TC59X WG08) and Mr Janssen (Convenor IEC SC59M/MT2) to explain the current EN standard and the new IEC standard in details. They showed the differences between the two and explained why they believe the new standard is more consumer relevant and adapted to the needs of both consumers and market surveillance authorities.

Mr Haerlen and Mr Janssen started by giving an overview of the current situation in the world and compared the current European standard with the ones used in Australia, US and Japan. They showed that a large variety of energy and performance standards are used at the moment in the world and that the difference between these standards are quite significant (temperature, load, door opening, etc.). A few years ago, IEC was asked to work on a new standard that would help to unify all these variations and that could be used all over the world. The new IEC standard was published in 2015 and is going to be the basis of the new EN62552-201X standard.

Mr Haerlen then identified the different factors that are influencing the energy consumption of cold appliances. He explained how each of these factors is considered in both the current and the new test standards:

(1) **Ambient temperature and humidity in the room**
(2) **Loading of warm stuff**
(mass of goods, initial temperature of goods, frequency of loading)
(3) **Number and duration of door openings**
(4) **Position of load inside the compartment**
(hindering air circulation, impact on compartment sensor)
(5) **Installation of the appliance**
(ventilation to and from the condenser)
(6) **Settings**
(special features, Eco-mode, etc.)

(1) Ambient temperature and humidity in the room – The current standard tests at only one temperature: 25.0°C. In the new standard, two temperature are taken into consideration: 16.0°C and 32.0°C. The weighting factor between the two temperature is not defined in the standard but is to be defined by the regulation. This leaves enough flexibility to follow the evolution of user behaviour over time and for the legislator to decide what is consumer relevant.

The idea of having two temperatures was introduced in the new test standard to make no longer possible an optimization at just one ambient temperature. This way, e.g. fridge/freezer combi appliances having two cooling circuits and offering a better and more efficient technology than those with only one cooling circuit will be rewarded.

(2) & (4) Loading of warm stuff / Position of load inside the compartment – What is the most consumer representative way of loading a fridge? Standardizers could not find any real answer to this question as every household has a different loading behaviour. The parameters to be taken into account are too numerous to average a typical user behaviour.

For the fridge compartment (fresh food), the current test standard measures the energy consumption and the storage temperature of the appliance at 5°C at steady state with no load. The reason for choosing not to test with load inside is because tests have shown that in steady state, there is no significant difference in terms of energy consumption and temperatures between a loaded compartment and an empty compartment. The choice not to include any load seems therefore logical in the sense that it is less costly and more reproducible while not altering the results. The new standard differs only slightly from the current one: the temperature was changed from 5°C in the current standard to 4°C in the new one. The test is here again conducted without any load.

For the freezer compartment (frozen food), the current standard measures the energy consumption and the freezing of the appliance fully loaded, most of the time without drawers (it is currently up to the manufacturer to decide to keep or not the drawers). Only the maximum temperature of the load is considered.

In addition to the energy consumption test, the new standard tried to consider the aspect of the load via a cooling capacity test which is comparable to the tests which were defined by the European consumer magazines.

In the new standard, the appliance is tested with the compartment empty similarly to the refrigerator and is tested as delivered to the consumer (with drawers). This time, the average temperature is considered. Once again, various experiments have shown no significant differences between the loaded and unloaded test in similar conditions (i.e. at the same controller settings). Moving from loaded to unloaded test is expected to bring significant reduction of the uncertainty of the results and of the cost of testing.

Furthermore, the new standard also introduces a new test to better reflect the real-life conditions of use. The load processing efficiency test measures effectively the efficiency of the refrigeration system by looking at the time needed to cool down a predefined load (water in bottles and water in ice trays) loaded at 25°C.

For freezers, the current standard already contains a freezing capacity test but the test is currently complex and time consuming. The new standard simplifies it by measuring the freezing time of a given load.

(3) Number and duration of door opening – The current and new standards do not require opening the doors during the testing for the following reasons: first of all, similarly to the loading, it is very hard to define a normal user behaviour concerning door openings. The number and duration will depend from one household to another, varying with the size of the household, its social behaviour, etc. A second reason for not including door openings is that it would significantly increase the cost and the complexity of the testing. Japan had this parameter in the previous standard for years; they strongly recommended not to have it in the future IEC standard and has shared negative experience due to increased uncertainty.

However, the impact of door opening is real and should not be neglected by the standard. Standardization bodies therefore decided to consider the incremental energy used after opening the door by raising the ambient temperature during the test. Research indicates that the energy consumption declared with 5K above the average ambient temperature indeed compensates for about 40 door openings daily of 15 second each.

Nevertheless, with such compensation, the effects of door opening on the defrost function are still not taken into consideration.

For this reason, the new standard also considers variable defrosts, which now have to be declared by manufacturers and/or verified by tests, this is not the case with the current standard. Finally, in the new standard, a maximum interval of 40 hours between defrosts can be claimed compared to defrost intervals of 48 or 72 hours used in the current standard. Here again the new standard is expected to bring more consumer relevance and to better simulate the real-life conditions of use; the impact of the defrost on the overall energy consumption almost doubles due to these changes.

(5) Installation of the appliance – Both standards consider only two types of installation: built-in and standalone. The difference between the new standard and the current one on that point consists in an improvement of the definition of installation. For example, the maximum backwall distance will be limited to 51mm. The description of built-in has also been improved and is now more precise.

(6) Other new elements of the new standard – Besides the introduction of the load processing efficiency test, the new standard contains a few additional new elements:
In the current standard, the volume is measured as “net volume”. This definition often causes problems of interpretation and suffers from several ambiguities. The new standard is changing the approach and refers to the

"cooled" volume approach. It measures the volume which is refrigerated and where products can in principle be stored in the appliance. CENELEC and IEC experts have been discussing for a long time the possibility for a concept of "useable" volume that would be closer to reality; however, there was no agreement on a definition due to the number of parameters to take into consideration: with or without baskets, drawers, shelf rearrangements, special features, etc. The method adopted for the new standard, although not perfect, reduces the uncertainty on volume and simplifies the approach.

The new standard also introduces more compartment types, it improves the prevention of circumvention practices, even long before Diesel Gate and simplifies the load scheme for storage temperature.

Mr Janssen concluded the presentation saying that the new standard had been developed trying to consider as much as possible the following criteria:

- It should reflect real usage conditions
- It should deliver accurate and reproducible test results
- It should show the differences between different design variants
- It should be available to be used for a wide range of appliance models
- It should keep test costs on a moderate level
- It should be adjustable to new technologies

Mr. Haerlen informed that the update of the EN 62552 standard is still ongoing and mentioned that there is still room for changes and inputs in the text in case any stakeholders sees the possibility to further improve it. He clarified that further modifications should however not negatively influence the benefits of having a global standard. Mr Haerlen invited all stakeholders to participate and join the next CENELEC TC59X/WG8 meeting, scheduled on 26 April in Frankfurt.

As a last remark to the audience, Mr Haerlen also stressed the importance that policy makers, when revising the regulation, take into accounts the consequences of these new testing methods on the declared performances of the appliances. The thresholds and requirements set by the future regulation should take into account both the revised energy labelling framework regulation and the new standard.

The presentation displayed during the workshop is available for reference in Annex 4.

CONSUMER RELEVANT TESTING

Mr Siderius (Netherlands Enterprise Agency) presented the results of the discussions happening within the CENELEC ad hoc working group created in 2016, following the Diesel Gate, to reflect on the consumer relevance of testing.

The objective of the group was to investigate on what is consumer relevant and on how to assess the consumer relevance in standardization. Mr Siderius informed that the results of this research will be summarized in a communication document to be used for future standardization activities. A first draft of the document has already been presented at CEN-CLC EcoCG and the final version should be available first half of 2017, he said.

According to the ad hoc working group, the criteria to evaluate a test procedure or a standard should be the following:

- The test standard should be repeatable

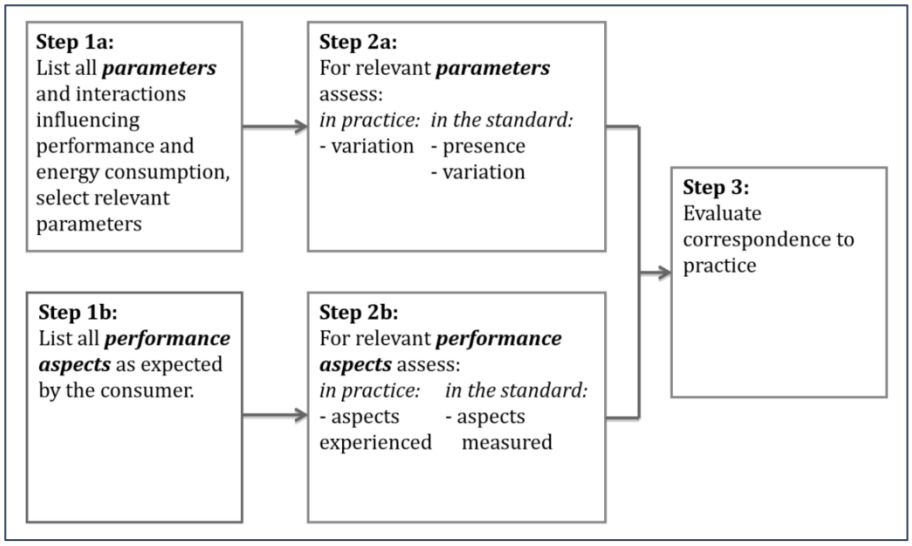
- The test standard should be reproducible
- The test standard should be valid (relevant)
- The test standard should keep costs at a reasonable level

When trying to define what consumer relevance is, the ad hoc working group came up with this definition:

> *"Consumer relevant product testing is product testing that corresponds to results obtained when consumers use the product in practice."*

Mr Siderius insisted on the fact that consumer relevance is not about reproducing real-life conditions of use and its primary purpose should not be to focus only on cheating devices (although this aspect should be of course taken into consideration). He said that there is nothing wrong if there are differences between the standard and real-life; the variation of situational conditions is often not captured in standards (combination of costs and reproducibility reasons). However, what is important is that these variations are being considered and in case it is needed, compensated somehow in the test procedure. The standardizers should pay special attention to verify that the assumptions made to calculate the compensation of a parameter are correct.

To assess the consumer relevance of a standard or a test procedure, the ad hoc WG recommended a list of steps to be followed when looking at a standard. These steps are presented in the figure below.



Mr Siderius said that if we look at the new standard for refrigerators, the recommendations made by the ad hoc WG above seem to have been quite well respected so far:

First of all, the new IEC standard allows for calculation of energy consumption at two different ambient temperatures.

Second, in the EN standard, door openings and loading of food seem to be sufficiently captured by using higher ambient temperature. It may however be necessary to further check the preliminary assumptions at the next revision.

Regarding the refrigerator volume and the load content: the test standard decides to prioritize a higher repeatability over the correspondence to practice. This was decided in order to enable market surveillance authorities to monitor the market efficiently.

As a conclusion, Mr Siderius reminded the participants that the correspondence to practice not only depends on the test methods defined in the standards, but also on the choices made by policy makers and set in the regulations. For example, the washing machine standard can in theory cover a very large number of programmes, however the regulation chooses from these options to keep testing costs reasonable. Moreover, a single efficiency indicator for the label is used. The test method in the standard provides a result, but the evaluation of that result is done in the legislation. This case illustrates that it is the regulation who should finally decide what to consider based on the costs implications.

The presentation displayed during the workshop is available for reference Annex 5.

PRESENTATION OF THE STEP PROJECT AND RELATED RESULTS

Ms Baton (CLASP) then took the floor to present the Smart Testing of Energy Products (STEP) project and to share for the first time in public some preliminary results of the research. She explained that the STEP was initiated in January 2016 by ECOS, Topten, EEB, ECF and CLASP.

The aim of the project is to create the political space for improving the regulations and measurement standards related to the energy efficiency of products and to ensure that these texts provide consumers with products that perform as closely as possible to their declared performances. The project focused on three products: TVs, dishwasher and refrigerators and consisted in testing the products as close as possible to real-life conditions in order to evaluate whether there were weaknesses in the regulations and test standards.

For refrigerators, 10 models were used for the research (4 freezers and 6 combi's), varying in size, price, complexity and brands. The tests covered the following measurements: Measurement of interior volume, EN 62552:2013 and IEC 62552:2015 (10) Comparison with energy and label, declarations, EN 62552:2013 (10), Door opening tests (10), Temperature changes (6), Energy saving modes (3), Influence of load/loading (3).

After introducing the project, Ms Baton presented a few preliminary results to the participants of the workshop. Main conclusions of the study were the following:

- For some of the models tested in the research, significant discrepancies were observed concerning the volume declared and the volume measured. However, a better correlation between reality and testing was observed when using the new standard test method. The new standard therefore seems to be moving in the right direction, she said. In its conclusions, the STEP Project will suggest a few clarifications.
- Concerning the energy label declarations, Ms Baton said that some differences were observed for some models. She also noted that some appliances could not reach the standard temperature. She put these results into perspective by informing that only one unit had been tested for each model. These results therefore do not automatically mean that appliances are not compliant.
- The impact of the door opening was ranging from very minor to very significant, depending on the appliance tested. In the opinion of the STEP project team, the steady state is therefore not sufficient to guarantee a fair comparison. They suggest including complementary door opening test or to take its impact more into consideration.
- Concerning the influence of the load, the STEP study concluded that empty tests are not sufficient to guarantee a fair comparison. In this regard, they positively welcome the load processing efficiency test of the new standard; on this aspect too, the new standard seems to be moving in the right direction.
- On the issue of ambient temperature, the tests conducted during the STEP study showed that 1°C difference in the ambient temperature can result in significant increase in energy consumption (from 4 to 8%). They therefore strongly recommend to improve the transparency of the settings of the appliance and to better educate the consumers on this topic.
- Finally, concerning special modes such as "Eco" and "Holyday mode", the study could not observe any significant savings in the few test conducted. Besides, the consumer is very often left with no indication of the effects of the special modes in the user manual. The STEP study here again recommends improving transparency to better inform consumers and to define criteria to be allowed to use "eco-mode".

The presentation displayed during the workshop is available in Annex 6.

VISIT OF LABORATORY

After the morning presentations, the participants of the workshop were invited to a lab tour in order to witness and learn more about how the tests are really conducted and with which material.

The lab visit was organised in four different stations, each one focusing on one particular aspect of the standards. The section below summarizes what was presented in each station. More information can be found in the annexes of this report.

(1) The first station focused on the test facility and test equipment. It showed participants in which conditions the test is performed for stand-alone refrigerators, stand-alone freezers and built-in refrigerators. The groups could see what the test chamber looks like and why it is needed to have a temperature and humidity control range. Participants could learn more about how the stand alone and built-in appliances should be positioned before to start the testing and they could discover the different instruments needed to get sufficient precision in the results (stabilized power supply, thermocouple, temperature reference thermostat, energy meter, power measurement system, etc.).

(2) The second station focused on the noise test facility. Participants could not visit directly a noise test chamber as it is located at another site of IMQ. However, they were given an interactive video presentation explaining which specificities a noise test chamber requires and which instruments are needed to measure the noise according to IEC standard 60704.

(3) The third station focused on the differences between the current standard (EN 62552:2013) and the upcoming standard (IEC 62552/1,2,3:2015). For the energy consumption, the group was shown the differences between the two standards in the loading and the positioning of the thermocouples in the fridge. The differences on the cooling performance test were also explained and IMQ experts showed how freezer and fridges compartments are loaded with the current standard and what changes the new standard will introduce.
The presentation displayed during the lab tour is available for reference in Annex 7.

(4) Finally, the fourth station focused on the new additional test procedures according to the upcoming standard. IMQ experts presented the cooling capacity test and the load processing efficiency test and explained how the standard simulates the load.
The presentation displayed during the lab tour is available for reference in Annex 8.

INTERACTIVE DISCUSSIONS IN SMALL GROUPS

After the visit, the participants were divided into six groups and were invited to discuss any topic related to the testing or to the future ED and EL regulations that they would find relevant. The outcome of these brainstorming was then presented to the audience by a representative of each sub-group at the end of the workshop. The section below summarizes the conclusions presented by the six groups, organised by topic. The composition of each sub-group can be found at the end of this report.

General remarks on the label and test standard

Group 4 made a general comment on the future energy label. In their opinion, the future new label should be clearly recognizable from the old one; the layout should be somehow different in order for consumers to see the difference.

Group 5 agreed on a general comment regarding performances and testing. They said that any performance declared or measured should be proven in practice to the consumer. In other words, there should be tangible proof that the appliance performs better if the manufacturer claims so. In that regard, any information to consumers should be limited to what can be verifiable.

Group 5 also agreed on the fact that the new test standard is a good improvement, especially for market surveillance authorities. By being quicker and more accurate, the test standard will help Member States to implement the regulation and to monitor efficiently the compliance of the market.

Comments on food preservation

Group 6 reflected on food preservation. A first thought, shared by all members of the group, was that food preservation is as important as energy consumption, if not more. In the end, preserving food is indeed the primary purpose of the appliance and this should be kept in mind when designing policies. The study on food waste shows that significant savings can be achieved by enhancing this primary function of the appliance. For this reason, Group 6 was in favour of promoting multi-door appliances and chill compartments via compensation factors. Such features indeed seem to improve the food preservation and the label should, somehow, reflect that. Such factors could be an easy and efficient policy measure.

Group 4 also agreed to say that the regulation should allow bonuses for compartments with features that improve food preservation. The group was not sure whether multi-door can help in that regard and suggested to further investigate that point. The group said that the largest bonus should be given to the type of compartment that saves most food.

Group 2 judged that an important aspect for food preservation is to provide enough information to the consumer about the temperature control and the temperature effectively reached inside the appliance. Sometimes, the temperature indicated by the display is inaccurate or the correlation between the indication of the fridge and the effective temperature inside is difficult to make. Helping the consumer to better understand this would perhaps help in better using the appliance and selecting the right temperature for a good preservation of the food. However, such information has a limited impact as the final decision remains in the hand of consumers. They do not always make the most energy efficient choice.

Group 2 also discussed the fact that different types of features could help to improve food preservation. Both multi-door and glass door fridges, for example, could be possible ways to reduce food waste. However, appliances with a glass door, allowing the consumer to better monitor and manage his/her food may appear to be inconvenient for the user and would probably not be a best seller. Indeed, one can imagine that not everybody would like to have a permanent view on what is inside the refrigerator. Some members of the group also said that different types of lighting could improve the preservation of some type of food.

At the end of the discussions, Mr Janssen summarized the comments as follows: food preservation is the main purpose of the fridge and that should be kept in mind by policy makers. Standardization is working (within IEC SC59M/WG4) on that issue in order to find a reliable method that would allow to prove and verify claims made by manufacturers. In the meantime, promoting chill compartment and multi-door features could be a possibility to address this issue in short term.

Comments on the defrost function

Group 1 agreed to say that the new standard is an improvement regarding defrost and that a minimum and maximum interval for defrost is a positive thing. It will be interesting to see how this evolution will be reflected in the regulation. Group 1, during the brainstorming, considered that ideally, the best would be having an information requirement on how often the defrost function is activated. However, this idea is difficult to implement in practice as it depends on many different parameters such as number of door openings, humidity in the room, etc.

Concerning defrost, Group 5 also agreed that the new standard is an improvement compared to the current edition. However, the group thought that there are probably possibilities to improve it further in future editions in order to be closer to real-life conditions of use.

Mr Janssen summarized the discussions as follow: the new standard seems to be in general welcomed as an improvement to the current one. However, some further research is needed for future editions to make sure that the defrost function is sufficiently compensated in the testing. A positive point is that the standard offers the possibility to adapt to various situations and to change the weighting of the compensation without changing the testing. This possibility should be looked at on the basis of additional research and testing. Mr Janssen however reminded that the activation of the defrost function is subject to many different parameters (door opening, weather, humidity, etc.). It is therefore difficult to determine an average behaviour and to reflect it in a test standard.

Comments on the loading

Group 1 noticed that the morning presentations showed different opinions among stakeholders. An interesting question is how much impact the load has on the final energy consumption. The answer to this question varies probably with the quantity of the load and several other parameters. However, Group 1 judged that it is interesting to keep reflecting on this point for future discussions in order to find the right balance with repeatability and time of the testing.

Concerning the load, Group 6 agreed to say that the testing with no load is better for repeatability and reproducibility. It also shortens the test time and therefore helps to reduce the costs of the testing for companies and Market Surveillance authorities. However, some members of Group 6 were concerned about the impact of testing with no load on the energy consumption of the appliance. They said that more investigation could be done to know more about the impact of the load. If any impact, the standard should take it into consideration and compensate it.

Mr Janssen summarized the discussions on this topic as follow: He said it would be interesting to compare the results of the STEP study with researches that have been done so far. The testing with no load is probably different in the sense that it changes the temperature distribution inside the compartment. The energy consumption would however likely remain the same. As the temperature distribution is an important parameter for food preservation, it would be useful to monitor that, possibly via a separate standard dedicated to food preservation. However, he strongly advises to keep the energy performance test with no load in order to keep the benefits of a simple and reproducible test.

Comments on the issue of door openings

Group 1 acknowledged that there had been negative experiences in other regions of the world where the door opening was introduced in testing as that significantly increased the cost of testing and the uncertainties. However, this parameter is obviously a very important one and it should not be neglected when evaluating the energy performances of an appliance. Members of Group 1 understood the reasons why the test should not necessarily include door openings. Nevertheless, they agreed that the extra energy consumption resulting from opening the door of refrigerators should be compensated. Research should continue to make sure that this aspect – that affects many other parameters of the appliance – is compensated enough in the measurement method.

Group 4 discussed the results of the STEP project presented during the morning discussions. Participants concluded that the effects of door opening should be carefully looked at and that it should be taken into account in the testing. However, the tests should be kept reproducible and affordable to allow good market surveillance and ensure compliance with the regulation.

Comments on the concept of “useable volume”

Group 6 discussed the volume and what could be the best solution for that issue. Group 6 agreed that having a definition for “useable volume” would be useful and could be a useful information for consumers. However, Group 6 recommended to keep that as an additional information and not to use that useable volume for the EEI definition as it is subject to too many different interpretations. A feedback from consumer organisation would be appreciated on that topic

Group 4 recommended to evaluate the measurement method for volume of the new global standard along with some alternative methods used by consumer associations.

Mr Janssen summarized the discussions on the useable volume as follow: he observed that many groups considered the information on useable volume to be valuable for consumers. However, most of the participants

seem to prefer not to use this definition for the label declaration. It could be additional information only as it is currently the case in Japan for example.

Comment on special features

Following the presentation of the STEP project, Group 3 focused on the special features of the appliances such as "Eco-mode", variable temperature control, etc. The group reflected on which of these features should be part of the testing and how they should be tested. Communicating more information on this aspect could be relevant both for the consumers, who could use their appliances more adequately and for the Market Surveillance authorities who need to verify the claims made by manufacturers.

Group 4 discussed what to do when appliances offer special features such as "super cool" or "super freeze". The group agreed that the tests should be conducted as described by manufacturers and this should be clearly communicated by manufacturers to market surveillance authorities. Group 4 also concluded that the standard should be written in such a way that it will also allow the testing of future technologies.

Mr Janssen summarized the discussions as follow: there seems to be a general consensus that more information to consumer on the special features and their effect would be beneficial. Also, manufacturers could provide more information to Market Surveillance Authorities about the mode in which the products are tested for declaration.

Comment on the ambient temperature

Group 4 recommended to better inform consumers that the ambient temperature of their kitchen can have a significant impact on the energy consumption of their refrigerators. This, if well understood by consumers, could bring significant energy savings. An idea was to have this information displayed in a simple and visible way as an ecodesign requirement.

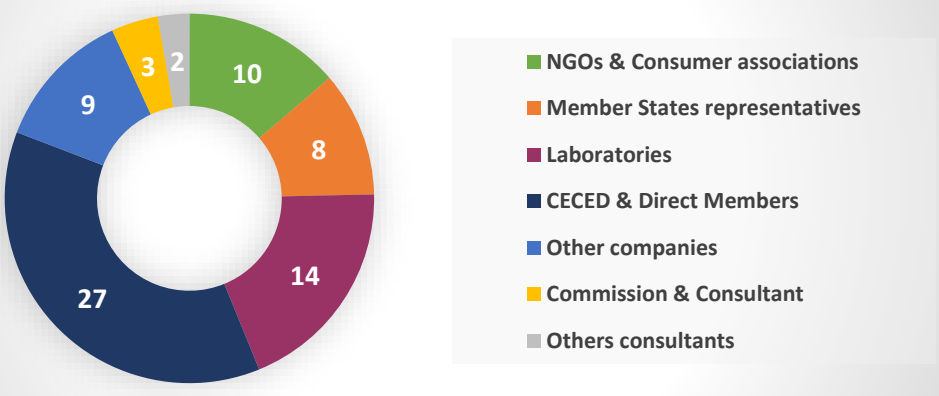
CONCLUSIONS

The aim of the workshop was to provide the 73 participants – representing all segments of civil society and industry – with a better understanding of the current and new test standards for refrigerators. The objective was also to allow all stakeholders to provide their views and analysis in order to feed the discussions at policy and standardization level. The workshop was in that regard a good opportunity to stress some important aspects that should be tackled by the future ecodesign and energy labelling regulations for fridges and freezers.

During the morning, participants were given a few presentations. Various speakers explained the status of the revision, the main conclusions of the preparatory studies and presented the current and new standards in detail. Some time was also dedicated to discuss the concept of consumer relevance and to learn more about the preliminary results of the STEP project.

In the afternoon, participants were invited to a lab tour to discover and witness how the tests are actually conducted. They were then divided into small groups to brainstorm and discuss on how the testing methods could be improved in future editions and on what aspects should be considered by policy makers when consolidating the future regulations.

During the workshop, members of standardization bodies invited all stakeholders to join the discussions at standardization level. They insisted on the fact that the active participation of all in the standardization process is what guarantees the final quality of the standards. The discussions and ideas summarized in this report will be shared with the relevant standardisation bodies and Commission as input for future discussions.



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