Solna, Sweden

2018-06-26

Dometic input on Stakeholder Consultation for the review of Exemption 14 of the ELV Directive.

Summary:

Dometic is with this paper submitting its comments in relation to the stakeholder consultation on the review of exemption 14 of the ELV Directive.

Dometic is committed to totally phase out sodium chromate as anti-corrosion agent for all its products with absorption cooling systems. The company has spent significant resources to find alternatives and we are now in the process of introducing the first products with an alternative corrosion inhibitor to the market. As we have explained in the application for exemption according to RoHS and in the application for authorisation according to Reach, the phase out is however a technical challenge and require re-design of the cooling unit and of the products. The risk of corrosion is strongly depending on the boiler temperature, and products with high boiler temperature require more engineering and more careful testing before a new inhibitor system could be introduced on market. We have started our chromate phase out for product with low and moderate boiling temperature, and we will gradually introduce the new system to all our products. Products covered by the ELV Directive have generally higher boiler temperatures as they operate, fully or partly, with gas burners. For these products the phase out will start as soon as we have finished the phase out for products with low boiler temperature.

Dometic is proposing a continuation of Exemption 14 in the ELV Directive. The authorisation of use according to Reach allow us to continue using sodium chromate for these purposes until December 2029. We however believe that a phase out in products covered by ELV for the European market could be made somewhat earlier, and **we therefor suggest a prolonging of the exemption in products until end of 2025.** For spare parts we would need a longer exemption period to not come into conflict with other legislations and customer requirements. Furthermore, we propose to fully align the wording of the exemption with the proposed wording of exemption 9 of the RoHS Directive. The additional phrasing in the existing ELV exemption, *"except where the use of other cooling technologies is practicable (i.e. available on the market for the application in motor caravans) and does not lead to negative environmental, health and/or consumer safety impacts"*, introduces a legal uncertainty and we do not see any benefit of this wording.

Reply on specific questions raised by the Oeko Institute

Q1:
Please explain whether the use of CrVI in the application addressed under Ex. 14 of the ELV Directive is still unavoidable so that Art. 4(2)(b)(ii) of the ELV Directive would justify the continuation of the exemption.

Dometic reply and comment:

Dometic have now started the phase out of sodium chromate on selected products. A new corrosion inhibitor has been developed and tested. Initially the inhibitor system will be introduced to products with low and moderate boiling temperatures.

Introduction of the new inhibitor system is however not a drop-in solution, but the individual cooling units must be re-designed to minimize the risk of corrosion. Furthermore, a safety monitoring system is introduced to the products.

Following our road map, the phase out of products with high boiling temperature will start as soon as we have finalized the phase out for our low boiler temperature range. Our plan is to have our full range of products converted to the new corrosion inhibitor in late 2025. Some small use of sodium chromate might be needed also after that date for spare part production of cooling units. The roadmap is aligned with the decision on authorisation for use according to Reach for our production entities in Germany and Hungary.

Dometic is proposing to keep the exemption 14 in ELV for hexavalent chromium in absorption refrigerators until end of 2025.

Q2:
If the substitution of CrVI is still not possible, please explain the efforts your organisation has undertaken to find and implement the use of hexavalent chromium-free alternatives in the manufacture of absorption refrigerators used in motor caravans. In your answers please refer to alternatives, which reduce the amount of CrVI applied or, which eliminate its necessity altogether.

a. Please compare potential alternatives with the CrVI based absorption refrigerators to clarify on a quantitative basis how alternatives perform in relation to the CrVI based absorption refrigerators currently in use in motor caravans in respect of parameters such as:

- ***Type of energy source:*** *Please refer in your answers to the differentiation made under the RoHS Directive and specify the type of energy source (und thus the boiler temperature) the adsorption refrigerator is designed to operate with.*
- ***Other:*** *Are there any other properties/qualities of relevance for the performance of the absorption refrigerator?*

b. For alternatives, which still have the potential to develop into a viable candidate, please provide information as to the various research and development stages that are still needed as well as a time range estimation for each stage.
Please take into account the timelines given in the REACH Regulation authorisation and in the RoHS exemption.

Dometic reply and comment:

The efforts undertaken to find and implement alternatives to the use of Cr(VI) has been thoroughly summarized in previous RoHS, ELV exemption and also REACH authorization applications. As laid out in the most recent application for RoHS exemption and REACH authorization we have identified one inhibitor (Inhibitor 7) that after extensive investigations have shown acceptable results. That is also why we have started the exchange of CR(VI).

a) When it comes to alternative technologies to absorption we still do not see any viable alternatives that could replace the absorption refrigeration in recreational vehicles.

   Type of energy source: The ability to operate on any heat source is the core property of the absorption refrigerator. This allows the use of LPG as primary fuel which in turn allows the use of the vehicles for extended time without access to mains electricity. The energy source is not directly connected to the boiler temperature but rather the application. In a recreational vehicle it is of paramount importance to also have access to a freezer. This in turn requires that more ammonia is boiled out of the solution and thereby the boiler temperature increases.
   It is of course difficult to estimate the portion of users that operate their products on gas but it is believed that it is a majority and that the product is only predominantly operated on electricity when in transit.

   Other important properties: Another important property is the ability to noiseless operation. This is particularly important in the small confined space of a recreational vehicle. What is also important is the possibility to reach a low enough temperature of the system to allow a freezer capability. This is vital for extended stay. The need for a freezer requires a higher boiler temperature in the absorption system and excludes the use of thermoelectric cooling as a viable silent alternative.

b) As stated above we do not see any other viable corrosion inhibitor to inhibitor 7 or any other viable technologies to replace the absorption refrigeration. Dometic is fully committed to an exchange. There are still several factors influencing the timeline.
   - Implementation of a new filling station (this has now been finalized and it is under start-up)
   - Change of the cooling units (to make the design more adapted to the properties of the new inhibitor)
   - Field trials in particular of the high temperature systems where the more complex user pattern but more strain on the corrosion protection and hence also require more verification
   - Development of electronic monitoring systems to ensure that any failure is detected prior to any leakage event.

We are now planning substitution of the first product groups by end of 2019 following the timeline in the RoHS application.

Our suggested termination of the ELV exemption by end of 2025 aligns in our mind well with the REACH application. For any industry it is important to secure the production capacity and any change related to factory foot-print needs to be known in advance. Therefore we believe that a general principle that the product legislation comes prior to production limitation is the proper procedure. With an exemption

terminated by end of 2025 Dometic still has the possibility to produce refrigerators for a few years more in accordance to the REACH authorization, this time period can be used for transition of the last products for outside of Europe and also for spare part production. At the same time it is a clear incentive for the industry to change as quickly as possible in the products.

Q3:
Is the existing ELV exemption still necessary to allow high performance absorption refrigerators with a freezer compartment to be placed to the market? Please clarify how these products correspond to the aspects raised in the REACH and ROHS formulations, i.e. in relation to the various functional parameters (energy source, boiler operation temperature, etc.) and whether they would be covered by the items specified for the RoHS exemption or for the REACH Authorisation?

Dometic reply and comment:

Yes, the exemption as stated above is absolutely necessary. There is currently no available alternative to absorption refrigerators for the market and thereby also no alternative to the use of Cr(VI) as a corrosion inhibitor. To achieve a cold enough freezer compartment, the boiler temperature will be around 200 C. The energy source will have less impact but the application will have more influence, a recreational vehicle will be subject to vibrations, uneven terrain etc. all things that can increase boiler temperature further which is also the reason why extensive tests are still required.

The necessity of a freezer in a recreational vehicle is similar to other applications operating on gas, e.g. remote locations without a stable electrical network. That is also why Dometic in its REACH exemption application has suggested a longer timeline for gas operated products whether in a vehicle or not.

The difference in boiler temperature when comparing for example a minibar(Low temperature) with that of a fridge/freezer is also why the REACH authorization allows the use of CR(VI) for use in high temperature products during a longer time period.

Q4:
What is the amount of CrVI that would be contained in absorption refrigerators used in vehicles
a) placed on the EU market and
b) worldwide
in case the exemption remains valid?

Please provide a substantiated estimate clarifying how you have arrived at the stated result.

Dometic reply and comment:

The total amount of hexavalent Chromium in in absorption cooing system is depending on the size of the cooling unit. At time being we have in a number of different cooling units with a sodium chromate quantity ranging from 5 to15 grams. This correspond to 1,6 to 4,8 grams of hexavalent chromium. Absorption refrigerators for vehicles placed on the EU market contain in average approximately 3,5 grams of hexavalent chromium. It is roughly the same for the products from Siegen and Jaszbereny placed into markets outside of EU. Dometic produces very few products outside of EU that end up on the EU market, the quantity is currently less than 5%.

In total (2017 figures) Dometic is placing approximately 520 kg of Cr-vi on the EU market related to products designed for vehicles. Given the low export of products outside of EU the additional quantity is very small. The imported amounts is also very small in particular since only a low volume of small refrigerators (minibars) are imported, thus the additional quantity would only be a few percent of the total.

It is here worth mentioning that absorption refrigerators fall under producer responsibility according to ELV and RoHS. Products under ELV should be dismantled before shredding and handled separately with drainage of the cooing media – including hexavalent chromium – and environmental sound treatment of the reclaimed media.

It is furthermore relevant to also state that the hexavalent chromate used in the cooling system is gradually converted to Cr(III) during operation. This is a central part of the corrosion inhibitor function where Cr(VI) is reduced to Cr(III) while oxidizing Fe(0) to Fe(III). This reaction is fast during the initial period of use thus rapidly reducing the amount of Cr(VI) in the filling solution.

Q5:
Based on prior evaluations, the consultants are aware that absorption refrigerators used in motor caravans are sometimes installed in these vehicles prior to the vehicle being put on the market, whereas in some cases, vehicle owners install such equipment in vehicles on a "do it yourself" basis.

a. Is there data as to the shares of absorption refrigerators originally installed in motor caravans and the share of "self-installed" equipment?

b. Do absorption refrigerators originally installed in motor caravans differ from those "self-installed" by vehicle owners in their design in terms of making use of Ex. 14?

c. Is there a difference between how absorption refrigerators originally installed in motor caravans and those "self-installed" by vehicle owners are treated at end-of-life (i.e. how is equipment treated, is equipment treated by ELV recyclers or by EEE recyclers, etc.)?

Dometic reply and comment:

a) The majority of our absorption refrigerators designed for use in vehicles are sold in B2B to RV (recreational vehicles) producers. The figures for 2015 indicated about 7% of the sales to others than PV producers. As we indicated in our input to the RoHS exemption[1], only about 10% of the aftermarket sales is actually referring to private customers. The majority of absorption fridges sold in aftermarket segment is sold to professional installers providing installation service. (less than 1%)

b) No

a) Our experience is that there is no difference in treatment between pre-installed or post-market installed refrigerators at end-of-life. Following the ELV Directive and the procedures for car dismantling (IDIS- system), the refrigerators should be dismantled before shredding and handled separately e.g. by sending to EEE recyclers. Dometic has been engaged in the developing information material on how to perform a safe end-of-life treatment of our products.

Q6:
Overall, please specify whether you agree with the necessity to continue the exemption and sum up your arguments for or against its continuation.

Dometic reply and comment:

Dometic strongly believes that an exemption is necessary in order to secure deliveries of an important product (Fridge/Freezer) to the fast growing recreational vehicle industry. It can be mentioned that the recreational vehicle industry is very positive for local tourist industry in the EU and also has the potential to reduce the amount of flying.

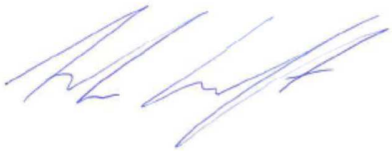
[1] Dometic reply on 2nd round of clarification questions, 13/1-2016.

At the same time Dometic believes that a time limit for the exemption is positive for all involved parties. For us as producers a time limit is create a predictability while also challenge us to prioritize. A time limit is also important to ensure that any substitute (that to Dometic experience will be more expensive) does not get a competitive disadvantage but rather get favored amongst product put into the market. This is particularly important since all our (known) competitors are producing their products outside of EU and are as such not effected by the REACH authorization requirement.

For the use of hexavalent chromium in new products, we therefore believe that end of 2025 represents a good balance between different requirements allowing a sufficient time for an exchange yet a sufficient pressure for conversion at the same time as it aligns well with the REACH authorization for Dometic. For the spare parts market it is important that we could continue using pre-charged cooling units containing hexavalent chromium also after 2025. As the new inhibitor cannot be used for old product without significant re-build we would need this possibility.

For any further questions or clarifications we are happy to assist.

For Dometic Group



Bernt Andersson
Dometic Holding AB
Hemvärnsgatan 15, 6th floor
SE-171 54 Solna, Sweden
Phone: +46 70 789 4903

E-mail: bernt.andersson@dometic.com

Dr. Anton Lundqvist
CTO
Dometic Holding AB
Hemvärnsgatan 15, 6th floor
SE-171 54 Solna, Sweden

anton.lundqvist@dometic.com