1st Questionnaire Exemption Request No. 2017-6

Exemption for „Bis (2-ethylhexyl) phthalate in rubber parts such as O-rings, seals, vibration dampers, gaskets, hoses, grommets and cap-plugs that are used in engine systems including exhausts and turbochargers that are designed for use in equipment that is not designed solely for consumer use“

Abbreviations and Definitions

DEHP	Bis(2-ethylhexyl)phthalate
EUROMOT	The European Association of Internal Combustion Engine Manufacturers

Background

The Oeko-Institut and Fraunhofer IZM have been appointed within a framework contract[1] for the evaluation of applications for the renewal of exemptions currently listed in Annexes III and IV of the new RoHS Directive 2011/65/EU (RoHS 2) by the European Commission.

The European Association of Internal Combustion Engine Manufacturers (EUROMOT)[2] has submitted a request for the renewal of the above mentioned exemption, which has been subject to a first evaluation. The information EUROMOT has referred has been reviewed and as a result we have identified that there is some information missing. Against this background the questions below are intended to clarify some aspects concerning the request at hand.

Questions

1. You propose an exemption wording for the use in “*equipment that is not designed solely for consumer use*“. However it can be understood from the information provided that the exemption request covers the engines in end-user equipment. Please explain what is meant by “consumer use”, specifying the applications in which the engines are used in this respect.

Equipment that are not intended solely for consumer use can be differentiated from types intended for consumers as follows: consumer-use products are designed primarily to provide a machine function at a lower cost for a typical consumer. This can be achieved by analysis of duty cycle of a product and use of lower cost components, along with a lowered expectation in rebuild and repair and ease in the design. These are typically lower duty cycle machines which can still have a satisfactory useful life for consumer expectations at a market acceptable

[1] 1 The contract is implemented through Framework Contract No. FWC ENV.A.2/FRA/2015/0008 of 27/03/2015, led by Oeko- Institut e.V.

[2] 2 The exemption request is supported by the following organizations: National Association of Manufacturers, AEM – Associa-tion of Equipment Manufacturers, OPEI – Outdoor Power Equipment Institute.

consumer cost. A typical duty cycle for a consumer product is 5% to 10% (and can be much less) where Worksite Commercial Products and Industrial Production equipment are designed for a duty cycle of at least 50% up to 100% for some equipment. We are trying to differentiate here between models of equipment that are specifically designed for use by consumers and those that are intended for professional use, although may also be used by consumers.

Equipment intended for consumer markets tend to be used for shorter periods and less frequently than professional equipment. Professional use equipment is designed for reliable daily use (for many hours per day) for many years, whereas typical consumer products may be used for one hour per week or less. This is a significant difference because the stresses, strains and wear on the professional equipment being far greater than the consumer types and so designs are different. Equipment is generally designed either specifically for professional users or for consumer markets, but this exemption is for the former types only.

2. In the application the following types of equipment are specified as equipment for which the exemption is requested:

   – "Fixed and mobile generators

   – Fixed and mobile compressors

   – Agricultural irrigation pumps. These are standalone equipment which may be moved from one field to another, but are stationary when in use.

   – Drilling machines

   – Rock crushers

   – Welding sets that are mounted onto trailers.

   – Commercial types of equipment that may be sold to leasing companies and that could be used by both professionals and consumers. These would include chain saws, leaf blowers, some types of mowers, small-size diggers, etc."

   Do the engines in these equipment all work under the same conditions or are there differences that influence the requirements on the rubber components? If relevant, please specify such requirements for sub-groups of equipment.

The extremes that can be experienced by rubber components in all of the above types of equipment are expected to be similar.

3. In the application, EUROMOT states on the content of DEHP in homogeneous material: "*Typically there are two main ranges, about 2 – 10% DEHP in rubber parts such as hoses, O-rings and seals and about 10 – 30% DEHP in rubber coatings on gaskets.*" What does the concentration of DEHP depend on in these two groups?

Information from suppliers indicates that all of the rubber components covered by this exemption request except gaskets contain 2 – 10% of DEHP. Gaskets generally have a higher plasticizer content to provide more flexibility to the gasket material, which is critical considering the differential uses within the engines for gaskets versus other rubber components.

4. The request covers the general rubber engines components ("rubber parts such as O-rings, seals, vibration dampers, gaskets, hoses, grommets and cap-plugs") whereas in the application for some rubber parts, there are limitations mentioned such as e.g.:

    a. for hoses: "Rubber vent tubes (a type of hose) contain DEHP and are used to ventilate the crankcase."
    Note that rubber vent tubes are an illustrative example of hoses.

    b. for gaskets: "Only some of the gaskets in an engine will contain materials that contain phthalates."

Please provide a matrix indicating which specific applications of hoses, gaskets etc. need DEHP and which specific property is provided by DEHP.

DEHP is always used as a plasticizer, but it is also used to achieve specific tensile and other properties as described in the exemption request document. Achieving the combinations of properties is the reason for its use in all rubber engine components.

We state that only some types of gaskets use DEHP. This is determined based on composition (whether the gasket uses rubber), but ultimately based on usage and location (where within the engine the gasket is used). If the location is very hot such as in the hot regions of an exhaust, then rubber will decompose and so cannot be used. At some locations, where the internal pressure is fairly low and also at low temperature, then rubber may not be required to achieve a seal and so paper gaskets can sometimes be used which have the advantage that they occupy less space than other types and so are used if they are reliable.

We believe the above information should address this question's intent of determining which types and applications of hoses and gaskets use DEHP based on their usage.
not see that providing a matrix will be helpful.

5. You state in the application that "substitutes for all rubber parts that contain DEHP are not yet available for assessment and testing." Please specify for which rubber parts substitutes are available and detail the testing that EUROMOT (i.e. its members) has already performed with such substitutes.

Despite the ongoing challenges faced by engine manufacturers in obtaining clear information about the RoHS compliance of their suppliers, information that has been obtained – both on an ongoing basis and as part of preparation for this exemption request – indicates that DEHP is a commonly used plasticizer in rubber engine components. While examples of DEHP-free rubber are available on the Internet, these components are typically designed for uses other than in engines or for engines in other types of equipment. For example:

- DEHP-free O-rings are available but these are intended for medical applications where the performance requirements are very different to those in engines - see http://www.fresenius-ka-bi.no/Documents/Open%20files/NO/MD/MD%20Datablad/Volumat%20Agilia/IV_sett_Agilia_Volumat.pdf

- Other suppliers are e.g. Parker Hannifin, see https://www.parker.com/literature/O-Ring%20Division%20Literature/RoHS%20(June%202013).pdf. Parker Hannifin products are used in a variety of industry sectors.

- Phthalate-free O-ring seals designed mainly for chemical plant are available: http://www.sspseals.com/fkm-aflas-ffkm-o-rings.html This supplier claims chemical resistance is suitable in a variety of fluids, however testing will still be needed to assess reliability in engines.

- DEHP-free seals and gaskets intended for medical and other sectors are marketed but these are not intended for use in engines.

These components thus need to go through extensive testing for the engines in the scope of this exemption to determine if they will have sufficient reliability. Such testing is underway, but reliability cannot be assured until the testing described in the exemption request is completed.

Research is being carried out by the automotive sector with alternative plasticizers, but the use conditions of equipment covered by this exemption request are more severe than automotive and so performance in the automotive sector cannot be assumed to be the same as in the industrial equipment sector.

6. For which types of rubber engine components could substitution be possible at an earlier stage than for other, due to e.g.

   – lower DEHP content in the rubber material; or

   This changes the tensile and other properties so that the material will not function correctly. Parts made with reformulated rubbers will require the same period of reliability testing as possible candidate phthalate-free components.

   – specific properties of the rubber material provided by DEHP;

   This is answered by Q6A of the exemption request. The combinations of properties are necessary and changing to a different plasticizer or lowering DEHP content alters these properties.

   – easier replaceability of the rubber engine component;

   This is not feasible, as most rubber parts can be replaced only by dismantling the entire engine, which means that the equipment cannot be used for several days at least. Also, replacing these components would also likely generate additional waste, as it is common practice when replacing these parts to also replace the lubricant, gaskets, and seals. Another issue is when engines are maintained in the field, there is a risk of dirt ingress every time this is carried out and dirt can shorten engine lifetime because of increased abrasion and wear.

   – other aspects – please specify.

   None known

7. Please propose a different wording of the exemption request considering whether the exemption could be split to differentiate between:

   a. Specific rubber engine components with different ranges of DEHP;

The exemption request could separate gaskets (with lower levels of DEHP (2 – 10%)) and gaskets ((2 – 30%)

b. different timeframes for expected substitution;

As the time-scale required is the same for both of the above (as described in the exemption request) and so there is no benefit in separating these types of components

c. relevant application sub-groups.

None known

8. As part of the evaluation, socio-economic impacts shall also be compiled and evaluated. For this purpose, please provide details in respect of the following in relation to all EEE placed on the EU market through this exemption (i.e., not just by EUROMOT's members):

    a. Please estimate possible amounts of waste to be generated through a forced substitution should the exemption not be granted. In this respect, please clarify if such a scenario would result in limitations to further use and maintenance of certain equipment (e.g. equipment placed on the market in the past[3], refurbished equipment, leased equipment, etc.).

    b. Please estimate possible impacts on employment in total, in the EU and outside the EU, should the exemption not be granted. Please detail the main sectors in which possible impacts are expected – manufactures of relevant engine equipment, supply chain, retail, etc.

    c. Please estimate additional costs associated with a forced substitution should the exemption not be granted, and how this is divided between various sectors (e.g. private, public, industry: manufacturers, suppliers, retailers).

    d. Please give estimations on the size of the EU market for all equipment expected to benefit from an exemption should one be granted.

For this exemption request, the exemption is needed because reliability cannot be assured and so at present there is no alternative designs that are proven to be reliable. Our exemption request is made, therefore, on the grounds of reliability, and not requested based on the socio-economic impact.

6a

This is difficult to calculate because, engine manufacturers may not be permitted to supply less reliable engines in the EU. This would be applicable to engines that are also in scope of the NRMM Emissions Regulation as explained in the exemption request.

6b

Failing to grant this request would likely have a negative impact on EU jobs and competitiveness if many engine types and associated equipment cannot be sold in the EU, and a broader negative impact if equipment sold in the market is less reliable, as this would negatively impact productivity.

[3] Article 4(4)(f) of Directive 2011/65/EU: EEE which benefited from an exemption and which was placed on the market before that exemption expired as far as that specific exemption is concerned.

6c

There is unlikely to be an additional cost because engine manufacturers will have to conduct the research and testing of engines with substitute components when these become available if they want to supply to the EU market (as they are already working to do). This process could not easily be accelerated (e.g. by higher expenditure) because the availability of suitable engineers is limited and this cannot be changed in the short to medium term. The biggest negative impact would be to EU users who would not be able to buy new equipment and so would either be forced to use old increasingly unreliable equipment (if this is available) or not be able to operate in the EU.

6d

Not known at present.

9. According to Article 5 (1)(a) of the RoHS Directive, exemptions can only be granted, "provided that such inclusion does not weaken the environmental and health protection afforded by Regulation (EC) No 1907/2006" (i.e. the European chemical regulation, REACH). DEHP is included in Annex XIV of REACH.[4] This means that manufacture and use in Europe is not possible after the specified sunset date (21/02/2015) without an authorisation for application. Has EUROMOT or respective members requested an authorisation for the use of DEHP in the relevant rubber materials and applications? Please provide detail in relation to this aspect.

All of the rubber components for which this exemption is requested can be sourced from manufacturers located outside of the EU where REACH authorization of the use of chemicals is not applicable. Only articles are imported into the EU and used in the EU. Thus, complete engines, equipment with engines and rubber components are all articles and are all imported into the EU so authorization is not applicable and there is no need to request authorization.

Our understanding of the current situation is that EU rubber manufacturers are not able to make rubber containing DEHP in the EU, but EU component manufacturers are able to import rubber sheet, block and other forms which contain DEHP from rubber manufacturers located outside of the EU as these forms are defined as articles.

Please note that answers to these questions are to be published as part of the available information relevant for the stakeholder consultation to be carried out as part of the evaluation of this request. If your answers contain confidential information, please provide a version that can be made public along with a confidential version, in which proprietary information is clearly marked.

[4] https://echa.europa.eu/de/addressing-chemicals-of-concern/authorisation/recommendation-for-inclusion-in-the-authorisation-list/authorisation-list