28 January 2020

# Stakeholder consultation on the RoHS2 Substance Review –

# Diantimony trioxide

# Contribution from EUROMOT (the European Association of Internal Combustion Engine Manufacturers), AEM (North American Association of Equipment Manufacturers) and EMA (US Engine Manufacturers Association)

## Questions for stakeholders participating in the stakeholder consultation:

Specific information is requested to the ratio of ATO to the flame retardant, e.g. weight or volume ratio and specification of the flame retardants.

**One of our members estimates that approximately 2,340 kg of ATO is used in products they place on the market in EEA annually. For perspective, a 6.7 litre heavy duty professional use diesel engine weighs approximately 600kg and contains approximately 11.7g of ATO in total. Therefore, the ratio of ATO to the engine in total is 513:1 or .002%. More information about the concentration of ATO in individual components is discussed later in this consultation.**

It should be further specified which halogenated flame retardant requires which concentration of ATO.

**Our members have largely banned the use of halogenated flame retardants. Because of this, no information on these ratios is available.**

Specific information is requested on the concentration of ATO used in most relevant applications which are • Plastics for housings / enclosures, • Cables, • Printing Wiring Boards. Specific information is requested on the amount of ATO in the above listed applications.

**The following concentrations of ATO in specific components were taken from a sample heavy duty diesel engine:**

| Component | ATO % Concentration | Total Weight of Component Material (g) |
|---|---|---|
| Heatshrink Tubing | 10% | 1.405 |
| Fuel Supply Tube | 6.5 - 9.5% | 37.87 |
| Fuel Drain Tube | 6.5 – 9.5% | 35.25 |
| Thermistor | 4.99% | .027 |
| Printed Circuit Board (PCB) | .001% | 24.15 |
| PCB Transistor | 1% | .351 |
| Housing | 5.5% | 6.04 |

1.) Can you confirm the conclusion that the most promising substitution routes for ATO are (a) substituting the halogenated flame retardant together with ATO as synergist ATO, and (b) alternative technologies?

**Due to known health effects, halogenated and chlorinated substances are generally banned from our members' operations except in extreme situations. Therefore, use of halogenated material is not considered a viable substitute or synergist for ATO. Concerning the use of alternative technologies, recent developments in non-flammable polymers have not been tested or proven in our application. Components used in our application are often exposed to flammable liquids such as diesel fuel and natural gas in environments with extreme temperatures: under-hood temperatures of our products can reach 260$^{o}$ C, surface component temperatures between 430 and 480$^{o}$ C, and exhaust gas temperatures up to 593$^{o}$ C. All of these temperatures are significantly higher than the flashpoint of diesel fuel (96.1$^{o}$ C). Our application would require extensive testing in both laboratory and real-world environments to ensure that alternatives are 1) capable of retaining performance characteristics in the under-hood environment and 2) able to perform equivalently to ATO in terms of flame retardancy.**

**Regarding the possibility of utilizing inherently flame retardant materials such as metal enclosures or housings, our members' products are already approximately 93% metal, with plastic and rubber components only being used where necessary.**

**High metal content is desirable in our application to facilitate reconditioning and supports the circular economy by facilitating second and third useful lifespans of 10 years or more after each rebuild. While testing for these materials may have been previously completed for consumer-oriented goods such as laptops and AV equipment, no test data is available for our application.**

2.) The outlined findings indicate that substitution of some components and parts of EEE might still be challenging. If this is the case, please provide evidence for which parts substitution is seen to be difficult. Please provide details on reasons.

**Of particular concern to our members are components used in under-hood applications due to their exposure to high temperatures. Also of high concern are components used in the cabins of professional-use equipment as this equipment is often operated in explosive environments. Extensive and thorough testing must be undertaken to ensure equivalent or improved performance of ATO alternatives in these types of applications. No testing has been conducted concerning the substitution of ATO because, up to this point, ATO has been viewed as a viable substitute to halogenated and brominated flame retardants.**

**In general, our members do not produce components which commonly contain ATO such as plastics, rubber and wiring. Instead, we only specify performance characteristics of these products to suppliers. Decisions on which flame retardant to use are commonly made several layers deep in the supply chain by manufacturers with whom our members have no contractual obligation. Because of this, substitution would require a significant chain of communication and approval beyond our members' operations.**

3.) Which technical criteria are relevant for substitution?

**Technical criteria that must be evaluated before substitution include (but is not limited to):**

- **Yield**
- **Tensile Strength**
- **Compression Set**

- **Elongation**
- **Age Simulation**
- **Impact Resistance**
- **Abrasion Resistance**
- **Electrical Isolation**
- **Thermal Isolation**
- **Vibration isolation**

**All the listed criteria would have to be verified as serviceable for the life of the equipment prior to considering the alternative a viable substitute. Flame retardant properties must remain as new for at least a ten-year service life under the aforementioned temperature conditions.**

4.) To what extent does line density affect substitution, especially regarding power cords, power adapters and display panels?

**Our members do not manufacture power cords, power adapters or display panels and cannot comment on the effect of substitution in these applications.**

5.) Please provide information on actually applied alternatives, especially on the application of inherent flame retardant materials.

**As previously mentioned, no alternative flame retardants have been tested in our application to this point. Therefore, no information on this topic can be provided.**

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