pinfa
Phosphorus, Inorganic & Nitrogen Flame Retardants Association

pinfa Advisory Board – Sixth Meeting

Thursday, 12th December 2019,
10:00 – 15:30 CET

BRUSSELS

The content of this report is a capture of the inputs from individual participants. The views included are therefore those of individual participants and not the consensus of the group as a whole

This report

1. Participants

External representatives

Jacob De Boer, *Head of Department Environment and Health, Vrije Universiteit Amsterdam*

Hervé Feuchter, *Fire Safety Engineer, CREPIM*

Frank Kuebart, *Managing Director, ECO Institut Germany GmbH*

Michael Neaves, *Programme Manager Circular Economy, ECOS*

Marc Sans Armenter, *Chief Officer, Catalan Fire Department*

Izabella Vermesi*, Fire Safety Engineer, Bureau Veritas*

Pinfa representatives

Esther Agyeman-Budu, *EMPA General Secretary*

Adrian Beard, *Chairman*

Jonathan Crozier, *Secretary-General*

Vicente Mans, *Technical Advisor*

External moderators

Simon Levitt *Moderator, Harwood Levitt Consulting*

Lars Stollenwerk *Assistant moderator, Harwood Levitt Consulting*

2. Purpose of the meeting

Pinfa represents the manufacturers of phosphorus, inorganic and nitrogen flame retardants (PIN FRs) and is a Sector Group within Cefic, the European Chemical Industry Council. The members of Pinfa share the common vision of continuously improving the environmental and health profile of their flame-retardant products. Therefore, Pinfa members seek to maintain a dialogue with the users of PIN FRs to identify the needs and technologies they are looking for.

In recent years, there has been increased public discussion about FRs. Concerns have been raised about the environmental impacts of FRs, largely, but not solely, about halogenated FRs. Conversely, where FR use has decreased, concerns have been raised about fire safety. A debate has emerged about the appropriate use of FRs and if alternatives being used provide sufficient fire safety.

This group convenes on average twice a year. It is an open group meaning Pinfa extends invitations to new stakeholders depending on the topics discussed.

The Chatham House Rule

The meetings follow the Chatham House rule, whereby minutes include who attended and what was discussed, but opinions are not attributed to individual participants.

3. Recap: Topics discussed in previous meetings

During the past five meetings, 9 core topics have been discussed, which can be grouped into 4 themes. In order to track key issues and their developments, the group keeps a running list of core topics and key questions for each topic. Not all of these topics were addressed in the 6th meeting.

a. Fire safety

Spread of fire
Firefighters report an increase in flashovers that happen very quickly, sometimes within as little as four minutes. This impacts escape time and fire fatalities. Fire-fighters are convinced this is connected to the use of modern, polymeric materials in consumer products. Furthermore, single compartment fires can very easily develop into multi-compartment fires. Insulation materials do not always slow the spread of fires, and polymeric window frames do not prevent fire spread sufficiently. Fire-fighters believe that standards focus too much on individual products, and not enough on the role of products collectively in a room or house environment. Such risks as compounded by a less mobile, ageing population because of reduced escape time in houses. A report from Belgium suggested it will worsen the risk of fire fatalities by as much as 30% by 2030.

Questions for group consideration

1. Can flame retardants help decrease the flame spread and should pinfa members take this into account more?
2. Should fire prevention strategies focus more on the interaction of flammable materials rather than their individual fire load? If so, how?

Statistics on fires
Fire statistics are insufficient and often collected differently in different countries. Some focus too much on the ignition source but not what led to flashover. Case studies on the benefits of extra regulation (e.g. the 1988 U.K. furniture regulations) have led to a polarised debate.

Questions for group consideration

1. Should the statistics issue be addressed, or are there other issues that should be tackled as a priority?

Fire safety data of flame retardants
There is no consensus on which facts and figures are relevant to analyse and evaluate fire safety tests. This leads to uncertainty on what constitutes a fire-safe product and undermines scientific analysis of fire safety.

Questions for group consideration

1. How do we move from agreed ‘micro’ evidence (fire tests, videos etc) to ‘macro’ evidence focussed on the number of fires, injuries and fatalities?

b. Advocacy & public opinion

Fire safety advocacy
Currently, there is a disconnect between fire-fighters witnessing problems on the ground, industry, and policy-makers. Fire-fighters are organised differently in and within each country (e.g. professionals, volunteers, military). They have not always had a resourced or unified advocacy voice. Into this partial vacuum advocacy groups have stepped in. This includes industries with a commercial interest.

Questions for group consideration

1. Is it a medium-term solution to have a European fire safety agency, similar to agencies that exist in other policy fields?

Public opinion on the safety and sustainability of FRs

Flame retardants continue to struggle with negative public opinion. There are no clear authoritative assessment or overview of alternatives to halogenated FRs.

Questions for group consideration

1. What more can be done to convince the public that there are safe FRs?
2. If companies are planning to move away from legacy flame retardants, what gives them confidence in the alternatives?
3. How do companies avoid regrettable substitution?

Positive lists of FRs

A number of organisations have created 'positive lists' of FRs considered to be sustainable and providing the required fire safety. It may be that this trend increases in the future to address the FR perception problem. For now, pinfa members have agreed to include specific information about product substances in their entries in the pinfa product selector.

- TCO (Swedish Confederation of Professional Employees) has created a positive list of 26 non-halogenated FRs, which continues to be viewed as an excellent example of encouraging the sustainable use of FRs.
- FRs have been assessed using the GreenScreen™ methodology. One OEM is now telling its suppliers to only use chemicals which score 2 or higher on GreenScreen.
- ChemSec launched a project, Marketplace, that focuses on listing chemicals that can be acceptable substitutes and encouraged pinfa and others to participate.

Questions for group consideration

1. How can sustainable FRs be further recognised?

c. Sustainability & public health

Circular economy

As this topic moves from theory to concrete policies, there are choices to be made about plastic additives, including FRs. Industry should prepare to implement practical choices concerning the circular economy.

Questions for group consideration

1. What will the circular economy mean for plastic additives such as flame retardants?
2. What should happen around product design and at the end of life?
3. What should happen to products currently in circulation?
4. How can circular economy goals and fire safety both be achieved for polymeric materials?

Smoke toxicity

Fire-fighters continue to worry about the long-term effects of being exposed to smoke. Pinfa previously commissioned scientific work on the smoke formation and toxicity of materials with flame retardants. Over 100 samples have been collected for testing, of materials with non-halogenated FRs, benchmarked against materials with brominated and chlorinated FRs, and base materials without FRs. The

results show that the PIN FRs overall have little effect on the toxicity and amount of smoke from polymers.

Questions for group consideration

5. How can we build on the Crepim-pinfa smoke study?

d. Emerging trends

Swedish FR tax

Sweden has created a tax on FRs, as a revenue-raising measure and a way to implement chemical policy without deferring to Brussels. Such tax creates the precedent of a patchwork of signals to the supply chain, further complicating choices about substitution. It is estimated to increase the price of a computer monitor by approximately 20%. Previously it had been argued that it is futile to support the abolition of the tax, but it could be possible for it to be amended and based on inherent hazard properties e.g. using GreenScreen.

Questions for group consideration

6. What should pinfa's reaction to the Swedish FR tax be?
7. Are there any other countries where such a tax is likely to be implemented?

The subsequent discussions of the group covered many of these topics and gave opinions which are covered in the report sections below.

4. The 6th pinfa advisory board meeting

The sixth pinfa advisory board meeting took place in Brussels on the 12th of December 2019 with a diverse group of stakeholders from the flame-retardant (FR) industry, downstream user industries, testing and research institutes. Discussions focused on two core themes: sustainability and fire safety.

Sustainability

View of ECOS

ECOS opened the debate on sustainability. They agree with the commonly held view that standards are quicker and easier to develop than drafting and implementing legislation. In addition, standards are developed consensually. This means that the latest expertise of companies/industry is included. Other benefits are the facilitation of trade, the ease of updating quickly as needed and ensuring compliance due to the early involvement of the regulated industries.

Yet, there are also potential downsides to using standards over legislation. Legislators lose power and have very limited control over the details, which strengthens the role of industry. In addition, the openness and transparency promised by standards do not necessarily take place in practice. The effectiveness of standards is also limited due to copyright limiting free and public availability and a lack of translation to national languages. Lastly, two other issues with standards are that conventional enforcement mechanisms are not applicable and that standards result in slower uptake and behavioural changes than legislation. This means that enforcement is important to ensure that standards on paper are implemented.

To drive industry transformation, ECOS formulated some recommendations for industry. Firstly, business models should shift from products to services. This means product life should be extended and sharing platforms should be explored. Additionally, circular value chains should be developed. Secondly, industry should know what chemicals they use in their products, and how to eliminate, substitute or isolate them. Thirdly, industry should improve the design and the materials used in their services. As plastic is highly combustible, the chemicals in the products that would be released are crucial. Fourthly, ECOS recommends prioritising remanufacturing, repairing and reusing over recycling. Recycling is not always the most sustainable solution and this should be reflected in the actions industry take. Fifthly, industry should engage proactively and positively with recyclers to identify the framework in which they should recycle. Lastly, industry is encouraged to support stakeholders in their participation in standardization and technical processes.

ECOS also thinks the EU should be doing more to become a champion of non-toxic approaches. The design of products is important and should be disclosed fully. Currently, products often do not last long enough to be environmentally friendly. ECOS wants industry to be clearer on their position towards the Green Deal as presented by the Commission or how they will deliver on the circularity that is needed according to environmental groups.

Recycling & how to improve the sustainability of materials (standards, legislation)

The discussion then moved to broader questions on recycling and sustainability. Participants claimed that in order to improve the recyclability of materials, industry should know what the materials consist of. This is especially valid for the construction sector. Existing buildings will need to be renovated and refitted for energy efficiency, so the problem is not limited to new construction projects.

There is often a bigger push for transparency from upstream in the production chain, rather than downstream. Downstream stakeholders generally resist attempts to improve the transparency of what materials contain. Some participants said the cosmetics sector could be emulated as a best practice, where the content information of products is published without relinquishing commercial confidentiality.

Every part of the supply chain considers the other to be the reason why these deep changes are not happening. This means that legislation will most likely be more effective than voluntary actions. If there are fewer players in a certain sector, voluntary action could be effective but this will diminish in areas with more actors. Standardization can be faster than legislation but this is not guaranteed according to some participants. Adding to that, some EU countries have prioritized cost-cutting over sustainability concerns. EU action, most probably legislation, will be needed to spur these countries in action to improve the sustainability of materials.

A possible option is the development of advanced mass spectrometry probes that can help solve ignorance of what materials a final product consists of. There are questions on scaling and cost of such machines. Public funding for specific projects can help alleviate the lack of resources.

It is important to note that recycling and the circular economy are sometimes in conflict with other green goals. Streamlining the use of plastic could result in solutions that use more fuel. As such, balances need to be found.

There is no EU-wide approval setting for the sustainability of materials. A possible option is emulating GreenScreen with standardised assessment schemes. Industry commonly argues that REACH is enough, however, this only sets the legal boundaries of what can be used or not. Some participants said that it would be beneficial to have a tool that indicates preferential products without banning the less preferential one.

Fire safety

Increasing firefighter representation in the design of buildings

The voices of the firefighters are often missing in the debates on legislation and standards. To give an example, when high-rise tower blocks were either redeveloped or being built in the 2000s, after decades of high-rise tower blocks not being particularly used, the sustainability concerns were taken into account from the very beginning, yet fire safety was not a central point. This means that the cladding and insulation of these buildings might reach environmental targets, but they could be fire risks. If we want to avoid this in the future, we need to involve firefighter experts in expert panels, standards bodies and so on. This does not negate that we need to also work on the circular economy aspects. It is important to ensure a holistic treatment and not sacrifice environmental sustainability for fire safety or the other way around.

In Spain, there is an advanced building code incorporating fire safety concerns. In the UK, the issue is that the building codes are in many cases unclear. There is no division of responsibility and fire brigades do not need to be involved in the building process.

Escape time and other aspects for firefighters

A key point for firefighters is the escape time. While producers are often focussed on the prevention of fire ignition, firefighters are specialised in the more advanced fire stage. Smoke suppressors would be extremely helpful to firefighters as they can handle 'clean' fires but smoke creates very dangerous situations, both for inhabitants and firefighters. The fire load, the amount of energy in flammable material, is not necessarily the most important criterium for firefighters, but rather how the energy of the fire load is released.

Compartmentalisation

Firefighting strategies today focus a lot on compartmentalisation. Yet, over-reliance on this single layer of passive fire protection can be problematic. If this layer is not properly installed or malfunctions, the entire fire defence strategy is undone.

Lack of liability and possible solutions

Participants claimed that the construction sector is very fragmented. There is almost never a single point of liability. This leads to finger-pointing without systemic changing of the problematic situation. According to some participants, inspectors should be educated more with a strong technical background and knowledge. The contractor also should have more responsibility from a legal point of view in order to ensure that they have an incentive to know what materials, for example insulation, is used in the building that they are constructing.

FR standards

Currently, only a few standards take smoke toxicity, smoke density or even smoke combustibility into account. Standards should reflect these, as they are important in a real-life scenario.

Flame retardants are supposed to act in the early stages of fire development. There are significant differences in how FR's react in a fire. Some significantly increase smoke production, others burn 'cleanly', even reducing the amount of smoke compared to untreated material. Replicating real-life scenarios in tests is too complex. There are a lot of different insulation types that interact with each other, creating significant differences in how the fire develops, which cannot be captured accurately in a test. Standards are good instruments for ensuring the use of FR's, yet installers are driven by commercial interests rather than the fire safety of their products going beyond the minimum standards. Some participants claim that just enough FR's are used to pass the test to allow the product on the market. The requirements of the test are what will be applied in practice, meaning commercial companies will not voluntarily increase the standards, which would make their products more expensive and thus less competitive. Safer products can be achieved by higher standards on products, and including heat release and smoke classifications in the standards.

Standards should reflect real-life situations as much as possible: the smoke of multiple products mixes which reacts differently. Scenarios should be tested, rather than single products. Of course, it is impossible to test every single scenario that will occur. It is hard to account for how many lives are saved by FR's because it is hard to prove that an absence is the reason for success.

Crepim smoke study on the effect of FR on smoke toxicity and smoke density

Crepim recently conducted and published their smoke-toxicity study, which showed that there is a vast difference in the reaction of different FR's to flames. The test also indicated the limitations of this type of tests: there is a limited number of material thicknesses that can be used in the test. Adding to that,

the various effects do not have specific standards to be compared and benchmarked to. While in the railway sector standards were developed, there is no sign of this happening in the construction of buildings.

Overall, the test indicates that FR's do not necessarily produce more dense or more toxic smoke than the untreated polymers. Yet, it is important to note that the test only indicates immediate health risks – long term toxicants and toxic effects were not evaluated in these tests. There are broad differences in the reaction of the various types of FR's and how they react to specific materials. In general, materials containing halogenated flame retardants released more smoke with higher toxicity compared to neat polymers or those treated with PIN FRs. Overall, the type of polymer was dominating the smoke generation. As the
worst-case tested, PVC released copious amounts of toxic smoke regardless of containing flame retardants or not.

Trends in the flame retardant industry

Overall, the consumption of flame retardants keeps growing with global Gross Domestic Product (GDP), because if more items requiring FRs like E&E equipment, building insulation etc. are sold, FR sales grow in synch. Halogen-free flame retardants have seen stronger growth over the last years than traditional brominated and chlorinated FRs. However, these do still grow, mainly because demand in less environmentally sensitive regions in Asia is still abundant, combined with extreme sensitivity for price in these markets.

Role of insurance companies

Insurance companies also have a role to play. While they consider the flammability of roofs in their pricing of insuring homes, they never consider the content of the homes. It would be powerful if they also considered the flammable content of the house inside.

Importance of educating private consumers

Public buildings often have better fire safety designs than residential buildings, while most fires take place in the latter. This makes educating private consumers a core task. The knowledge of consumers on the flammability of their furniture is often lacking.

Closing remarks on fire safety

There was a general agreement in the group that there is a problem with the interaction between fire and smoke. Some participants advocate changing standards. While various other participants agreed, they added that standards will never replicate real-life enough, which means we also should ensure the capacity and professionalisation of fire safety engineers. The group agreed that legislation has to keep up. Better FR's are expensive and the construction sector will not voluntarily implement this. The final higher price will have to be paid by the customer. Yet, if there was applicable legislation, this could change the fire safety situation in buildings. Waiting for an industry initiative is naïve according to some participants.

5. Ideas to Move Forward

The group was again positive about the initiative of the Advisory Board Meetings. The fact that there were participants from the scientific community was welcomed, particularly given the range of backgrounds and expertise in the room.

The solutions proposed in this document are high-level and pinfa likely has neither the resources nor the power to change, for example standards alone. Nonetheless, the group believes there are concrete actions this group can take in assessing what key questions we need to answer and to think about possible solutions that other relevant stakeholders can take forward.

The timing of the next meeting should be May/June 2020.

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This document, once agreed by the participants, can be used by any of the group in discussions with others, to show the areas of discussion and to encourage collaboration on the topics involved.

6. Link Collection

ECOS presentation given in the meeting

ECOSpresentation_pinfaAdBoard-mtg_Dec

Crepim Smoke Toxicity Test Campaign – How PIN FRs affect gas and soot toxicity of smoke in case of fire?

Crepim_pinfa_SMOKETOX_AMI_2019.pdf

Chart on timing escape in case of fire