pinfa

Phosphorus, Inorganic & Nitrogen Flame Retardants Association

Annual Report 2022

www.pinfa.eu

Contents

Foreword

After dealing with many Covid-19 related restrictions in 2020 and 2021, the year 2022 brought back some degree of normality for pinfa – we could go back to in-person meetings in addition to the many online meetings we have. Our general assembly in Düsseldorf in May was certainly a highlight, where people relished the opportunity for "live" interaction and networking.

pinfa was steadfast in its commitment to maintain high fire safety standards across the world, which minimise the risk of fire to the general public, by continuing to improve the environmental and health profile of our flame retardant products. This mission remains especially important to ensure the continuity of progress in fire safety awareness, safer design and fire resistance materials.

We further grew our PIN FR family and proudly welcome on board the new members Imerys and Javachem (China)!

The European Commission's Chemicals Strategy for Sustainability (CCS) has become a focal point of pinfa activities. pinfa addressed the topic early on and has been developing concrete ideas on how to respond to the challenges and chances of the CSS, in close collaboration with Cefic and our value chain stakeholders. Members of the pinfa Advisory Board – which brings together experts and scientists from varying fields of material sciences, fire safety, environmental sciences, and toxicology – provided valuable feedback on our roadmap wfor a Chemicals Strategy for Sustainability for Flame Retardants.

pinfa contributed to discussions in the EU policy context. We engaged in regulatory discussions around melamine, a nitrogen-based intermediate for a number of flame retardants, and dove deeper into the sustainability topics around phosphorous-based flame retardants.

pinfa strengthened our communications activities. We expanded our presence on social media through our LinkedIn and Twitter accounts in tandem with the pinfa website and Newsletter. pinfa (co-) organised a number of events on "Sustainable Electrical Vehicle Design" and "Safe and Sustainable-by-Design".

Our programme for 2023 continues on this exciting path: In addition to the ongoing topics mentioned above, we will continue to study recycling options and technologies for materials containing PIN FRs. We will be reaching out to our value chain partners, the fire safety community and European Commission to ensure that safer, greener flame retardants are seen as a role model for the EU Chemicals Strategy for Sustainability.

Adrian Beard
pinfa Chairman

Esther Agyeman-Budu
pinfa Sector Group Manager

pinfa EU

About pinfa

pinfa is the Phosphorous, Inorganic and Nitrogen Flame Retardants Association and is a Sector Group within Cefic, the European Chemical Industry Council. pinfa brings together companies manufacturing and using non-halogenated phosphorous, inorganic and nitrogen flame retardants (PIN FRs) and is open to other stakeholders. pinfa acts worldwide with its sister associations, pinfa North America and pinfa China.

The members of pinfa share the common vision of providing environmentally compatible fire safety solutions and continuously improving the environmental and health profile of their flame-retardant products. This vision is coupled with a commitment to support high fire safety standards across the world, standards which minimise the risk of fire to the public.

pinfa's main objectives are cooperation with the PIN FR industry value-chain, dialogue with institutions, development of scientific knowledge and provision of information and data on PIN FR properties and life cycles. pinfa's vision is detailed in our Mission Statement and formalised in our Operating Rules, updated in 2021

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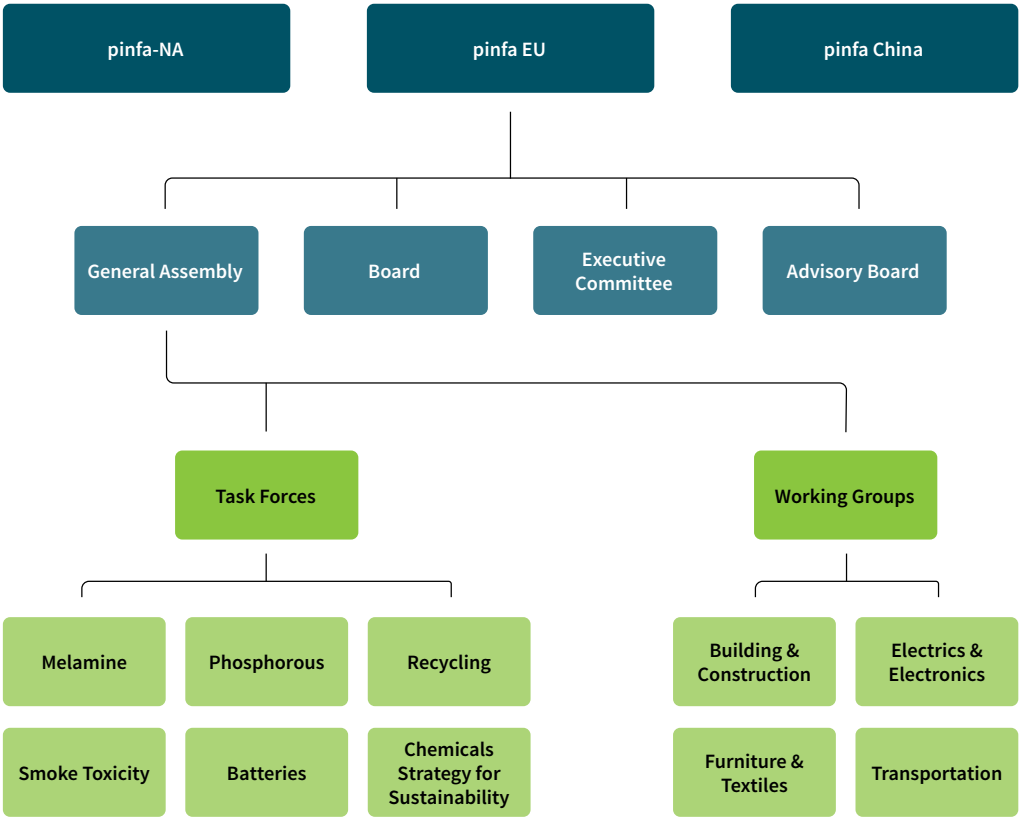


The members of pinfa at a general assembly meeting in May 2022, photo by Ralf Baumgarten fotodesign ©pinfa

The Executive Committee

Executive committee elected on 30 November 2021

Adrian Beard
Chairman

Thomas Futterer
Vice-Chairman

Christian Panofen
Vice-Chairman

Heiko Tebbe
Vice-Chairman

Esther Agyeman-Budu
Sector Group Manager

The Board

Adrian Beard
Clariant P&C (Deutschland) GmbH
Yann Bourgeois
Huber Engineered Materials
Thomas Esche
BASF Schweiz AG
Thomas Futterer
Chemische Fabrik Budenheim
Richard Green
ADEKA Polymer Additives Europe SAS
Béatrice Hermann
ICL Europe Cooperatief U.A.
Michael Klimes
Nabaltec AG
Marie-Raphaël Morvillier
ADEKA Polymer Additives Europe SAS
Christian Panofen
Huber Engineered Materials
Atsushi Sakai
ADEKA Corporation
Reiner Sauerwein
Nabaltec AG
Heiko Tebbe
Lanxess Deutschland GmbH
Oliver Toepfer
Nabaltec AG
Herman Vansteeger
Huber Engineered Materials
Ulrich Wietschorke
ADEKA Corporation
Yutaka Yonezawa
ADEKA Corporation
Annegreth Zoor
Huber Engineered Materials
Ugo Zucchelli
Italmatch Chemicals S.p.A.

New members 2022

A world leader in mineral solutions for industry and consumer applications, IMERYS offers performance PIN flame retardant synergists. IMERYS' mineral fire safety synergists for engineered thermoplastics and elastomers can help address fast evolving regulatory requirements and demanding use and technical performance specifications, with reduced CO2 footprint. www.imerys.com

"IMERYS looks forward to networking with the FR ecosystem and co-creating new solutions with players in the value chain. pinfa membership will facilitate staying at the forefront of the regulatory landscape and provide visibility in Europe and worldwide."

Mike Bird
Imerys

Javachem, a China national "High Tech Enterprise" develops performance P, P-N and nanoclay PIN FRs and synergists, within an innovative range of plastic additives. Active R&D is centred on non-halogenated and eco-friendly solutions and clean production processes, with production support available for specific application needs and active partnerships with leading plastics compounding companies. Javachem (Zhejiang Java Speciality Chemicals Co Ltd) was founded in 2000 and has two production bases in Shaoxing, Zhejiang and Jiujiang, Jiangxi. www.javachem.com

"Joining pinfa China, we hope to better understand the direction and needs of PIN FRs, to address challenges for industrial applications and to support the safety and sustainable development of the non-halogenated flame-retardant industry."

Dr Yuehui Zhou
Javachem

The Advisory Board

In recent years, there's been an increase in discussions around the safety and environmental impacts of flame retardants (FRs). Although largely focused on halogenated FRs, there has also been a rise in concerns over non-halogenated FRs. As a result, policymakers are increasingly debating on the appropriate use of FRs and whether alternatives to FRs provide sufficient fire safety protection.

With the aim of finding solutions to this critical societal concern, pinfa set up an Advisory Board in 2018. These meetings bring together stakeholders from the entire Fire Safety community; from the flame retardant industry, downstream user industries, testing and research institutes to academic circles, environmental experts, and firefighting departments. The Advisory Board meetings remain open to other stakeholders, invited on an ad-hoc basis for additional expertise. These meetings create the space for participating members and representatives to share varying perspectives and to learn from each other's experiences.

The Advisory Board meetings take place twice a year and discussion topics range from scientific or policy updates to practical, best-practice sharing with firefighters. In particular, the key issues addressed by the Advisory Board in 2022 were

- human biomonitoring (HBM) of exposure to FRs and policy implications in the context of the European Human Biomonitoring Initiative (HBM4EU)
- fire safety challenges in e-mobility,
- the concepts of a Sustainable and Fire Resilient Built Environment (SAFR-BE) framework
- Oganophosphorous flame retardants (OPFRs) and their grouping of chemical substances for regulatory scrutiny.

The photos on this page were taken at a visit to the Brussels Heliport Fire Station.

Policy & advocacy

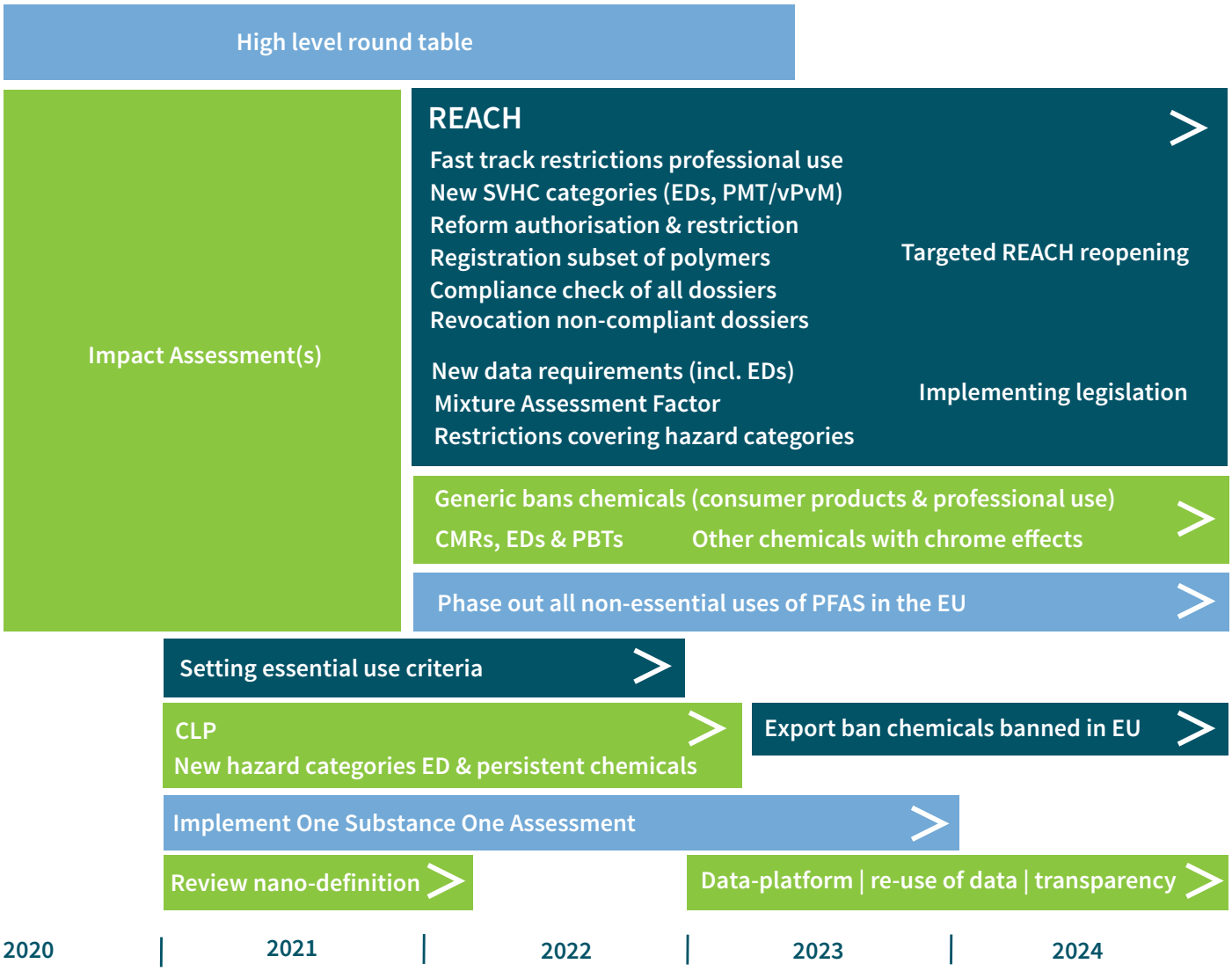
The new EU policy landscape: opportunities for more sustainable flame retardants

The European Chemicals Strategy for Sustainability

The EU "Chemicals Strategy for Sustainability … to ensure a toxic-free environment" promised in the Green Deal, was published in October 2020 and announced far-reaching developments in chemicals regulation and policies in Europe (summary pinfa Newsletter n°119). The European Commission's actions to reinforce and extend REACH have continued through 2022. A draft Delegated Act which defines the new hazard criteria for Mobility and Endocrine Disruptors was also published. New policies were announced on "sustainable-by-design" chemicals (with environmental footprinting of chemicals), on which a guidance document was published by the Joint Research Center of the Commission. Other topics are safe recycling, compliance enforcement of chemicals regulations, and information on chemicals in products (including Digital Product Passports). The "Chemicals Strategy" is part of the wider Green Deal "Zero Pollution Action Plan", addressing legislation on air, water, soil and waste, and which will further impact chemicals.

These new policies will pose challenges to some flame retardants, with pressure on chemicals which show environmental toxicity, persistence, mobility, bioaccumulation or endocrine disruption. Conversely, pinfa sees important opportunities for PIN FRs and for the PIN FR business in Europe, as the Chemicals Strategy aims to "promote the EU's resilience of supply and sustainability of chemicals used in essential applications for society through EU funding and investment mechanisms". Other Green Deal initiatives on products and articles will also strongly impact chemicals, in particular the "Sustainable Products Initiative" (expected to particularly target electronics and telecommunications, furniture and textiles) and the extension of EcoDesign. A draft EcoDesign regulation was also published in 2022 which defines the concept of "Substances of Concern".

Key regulatory actions underway in EU



Source : Economic Analysis of the Impacts of the Chemicals Strategy for Sustainability, Final Report for European Chemicals Industry Council (Cefic) - ED 14790, Issue number 1, Date 18/11/2021) https://cefic.org/app/uploads/2021/12/Economic-Analysis-of-the-Impacts-of-the-Chemicals-Strategy-for-Sustainability-Phase-1.pdf

Opportunities for PIN FRs within the new EU Chemicals Strategy

Flame retardants play an important role in the sectors cited for chemicals innovation and opportunities in the new EU Chemicals Strategy: construction materials, textiles, low-carbon mobility, batteries, wind turbines and renewable energy sources.

The Strategy announces regulatory challenges for all chemicals, including assessment of combinations of chemicals, new criteria for environmental toxicity, persistence, mobility, bioaccumulation, endocrine disruptors and nanomaterials. However, pinfa sees important opportunities for PIN FRs in objectives such as:

- Safe and Sustainable-by-Design chemicals
- REACH requirement for overall environmental footprint of chemicals
- emphasis on recycling and addressing "legacy substances" in waste streams
- identification of essential uses and applications of chemicals for society

"pinfa welcomes the challenges of the new Chemicals Strategy and sees opportunities to further promote the development and use of sustainable flame retardants, for example by collaborating in case studies on the "Safe and Sustainable-by-Design" concept. pinfa is reaching out to flame retardant users, environmental groups and regulators."

Adrian Beard
pinfa Chairman, Clariant

The elements of pinfa roadmap for a Chemicals Strategy for Sustainability for Flame Retardants, 2022-2024

Transparency and Information

- Persistence vs. Durability
- Safety information and data sharing
- Intended uses
  Important vs. Essential use

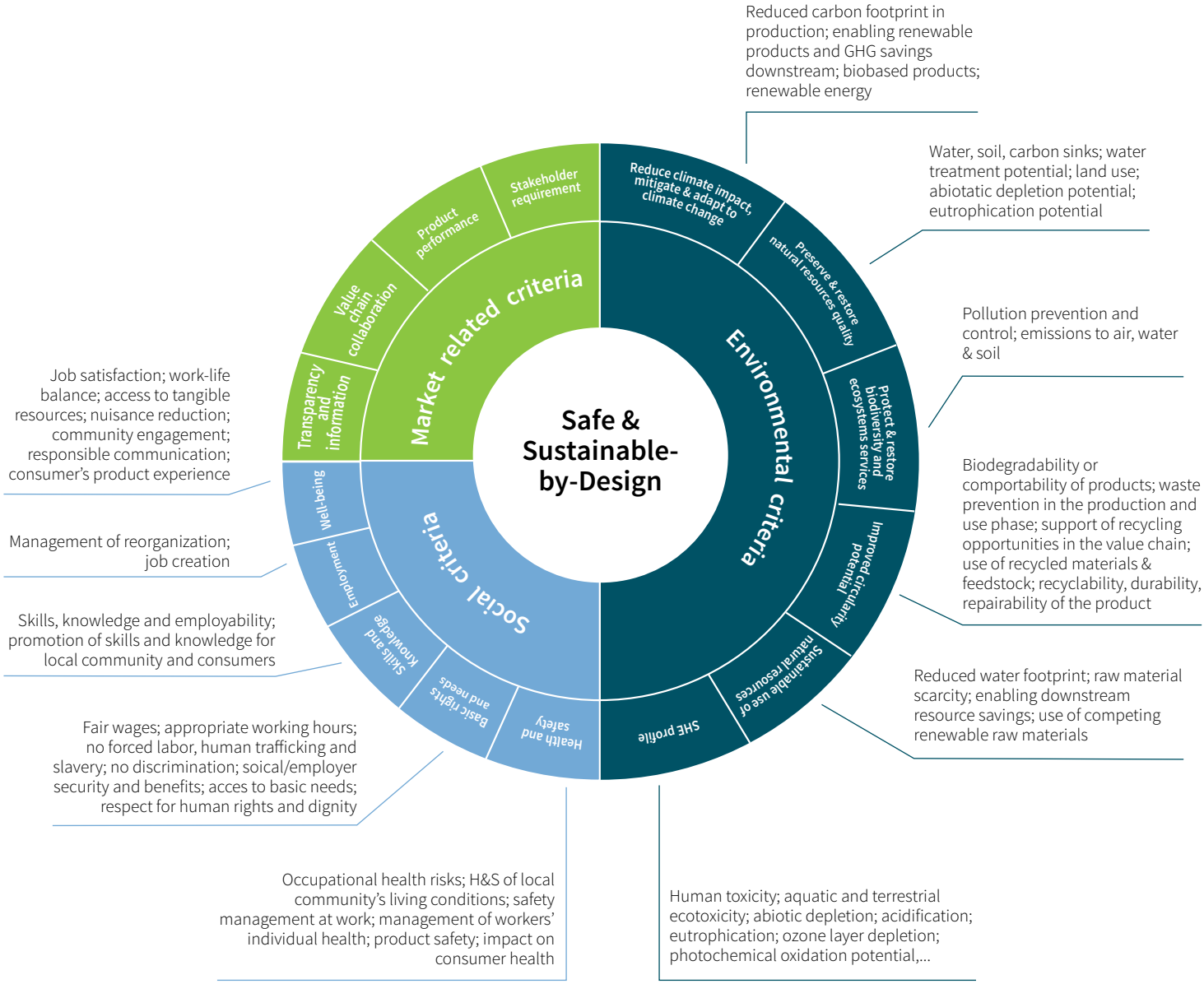
Commitments to Sustainability

- REACH dossier quality
- Avoidance of SVHCs

Projects

- Further prove the safety of PIN FRs
- Safe and Sustainable-by-Design
- Recycling of FR materials

Safe and Sustainably-by-Design: example of consideration of the production phase



Source : https://cefic.org/library-item/cefic-safe-and-sustainable-by-design-criteria-infographic/

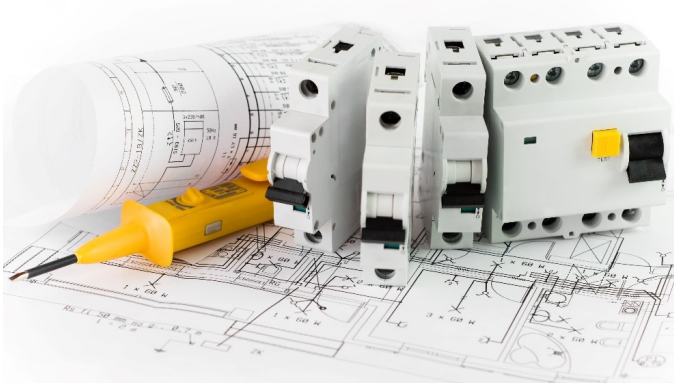
Sustainability Taskforce on Melamine-based Flame Retardant

pinfa's Product Sustainability Taskforce on melamine-based flame retardants (FRs) has increased its monitoring efforts and activities geared to safeguard the interest of melamine-based flame retardants, as melamine continues to be under regulatory scrutiny. Applications of melamine in fire safety are <5% of total melamine use, and mostly this is as an intermediate for production of PIN FR melamine compounds. Melamine itself is not significantly present in these melamine-based FRs (usually < 0.1%).

In May 2022, Melamine's classification as Carcinogenic 2 and Specific Target Organ Toxicity - Repeated Exposure (STOT RE) 2 under CLH (18th ATP) was published in the EU's Official Journal. Now, an 18-month implementation period will run until 1 December 2023.

On 17 January 2023, melamine was formally identified as a SVHC by ECHA (European Chemicals Agency) and added to the REACH SVHC candidate list.

In response to these developments and to give downstream users more clarity, pinfa has issued a document on frequently asked melamine-related regulatory questions (Q&A) on its website. Members intend to regularly update the Q&A as well as provide downstream users with up-to-date information on the ongoing regulatory process.



Due to the high nitrogen content, melamine-based FRs are used in a wide range of flame-resistant materials, to achieve the necessary international fire safety standards. These include mainly electric and electronic applications (e.g., switches, connectors, charging cables) where UL 94 and IEC 60695 are relevant standards. They are also used in building and construction applications with EN 13501 defining the fire performance and test standards. Applications also include coatings for fire resistance for steel structures regulated in EN 13381-8.

"It is our obligation to not only safeguard combustible materials using melamine-based flame retardants, but also to remain compliant with regulations and advance our melamine-based technologies to meet current and future safety standards."

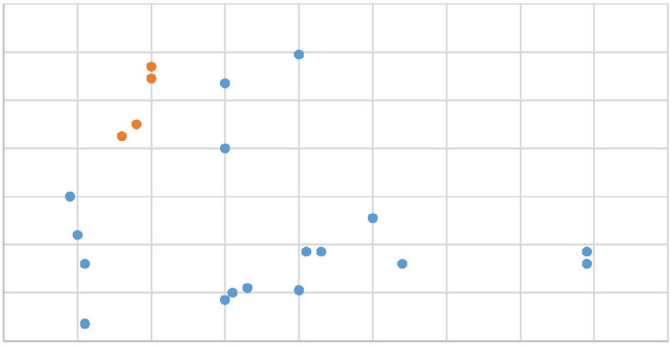
Thomas Futterer
pinfa Vice-Chairman

Sustainability Taskforce on Phosphorous-based Flame Retardant

Phosphorous is an extremely versatile element and the diversity of its chemical compounds is reflected in a large span from benign and biogenic chemicals like the phosphates that are part of our DNA (this time not an awkward analogy, but the exact truth) to intentionally toxic pesticides and nerve gasses. Flame retardants are of course meant to be non-toxic and harmless in the environment, nevertheless some phosphorous-based flame retardants have hazardous properties as neat chemical substances. This should not translate into significant risk for commercial users or end consumers. Phosphate esters are the largest group of phosphorous-based flame retardants in commercial use and even they span a variety from akyl- to arylphosphates, small to large molecules to oligomers, as well as chlorinated versus non-halogenated types.

pinfa has continued its work on the topic of grouping chemicals for evaluation, risk assessments and consequently regulatory purposes. While it is understandable to see grouping as a way to simplify and speed up substance assessments, there can be substantial differences in chemicals, which are structurally similar. Therefore, this kind of simplification bears a high risk of excluding sound alternatives for substitution. Phosphorous-based flame retardants or the sub-group of organo-phosphate flame retardants (OPFRs) include a broad range of substances with differing characteristics, formulations and intended uses, so it is difficult to group all these substances together or make broad conclusions on a wide range of substances. Therefore, pinfa commissioned Peter Fisk, a well-know (eco-)toxicologist from the UK, to prepare a review of possible grouping approaches for phosphorous-based flame retardants. Peter presented his findings in a pinfa webinar and his report is here. One result is a phosphorous-based flame retardants (PFR) family tree based on chemical structure and commercial / technical relevance.

Report for pinfa: Grouping of organophosphorus flame retardants in the context of REACH", Peter Fisk, Green Chemical Design, 2022

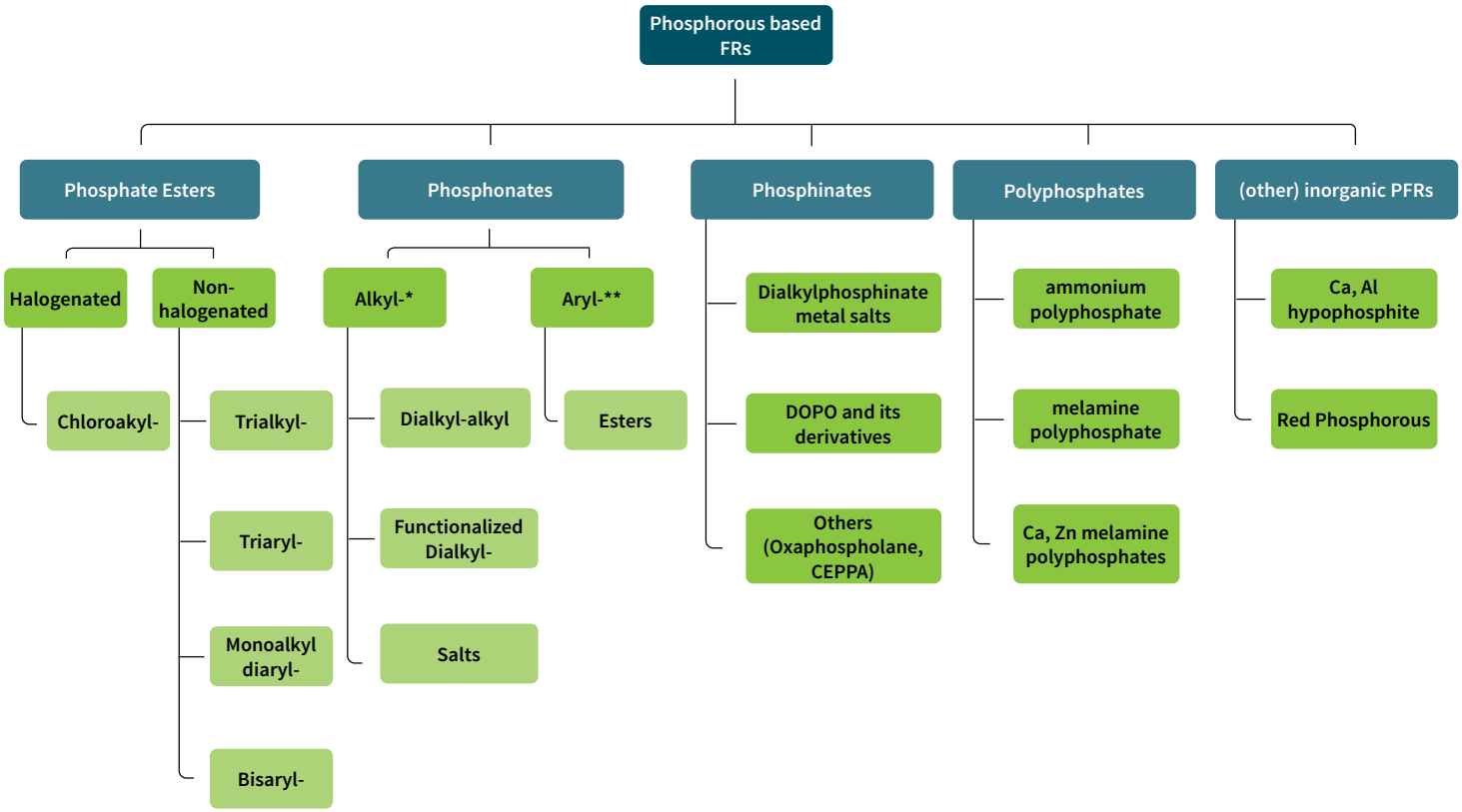


Source: Comparison of grouping of phosphate esters (blue) and phosphonate esters (orange) from HSP values.

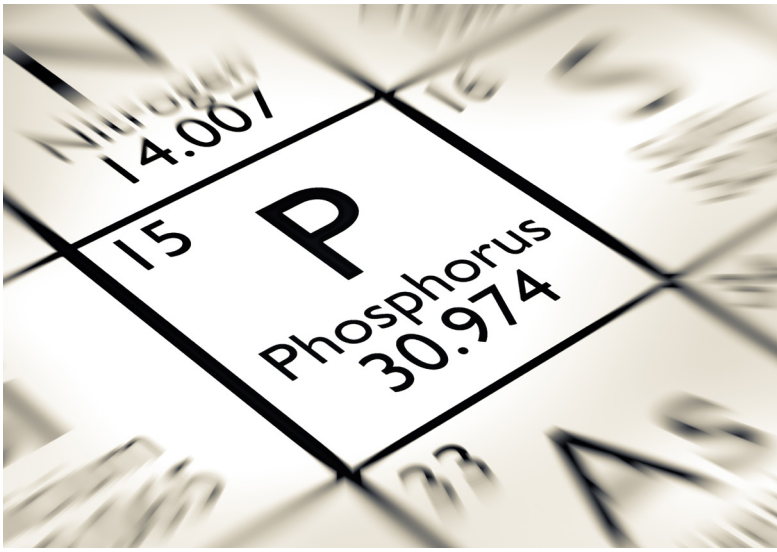
"When grouping phosphorous-based flame retardants, it should always be checked whether a sub-division is necessary: the different non-halogenated phosphate esters are an example of major differences in environmental behaviour and toxicology within a structural group."

Peter Fisk
Green Chemical Design
P-Fisk_organophosphorus_flame_retardants_grouping_for_pinfa_2022-07_final.pdf

The Phosphorous-based Flame Retardants Family Tree



In April 2022, the European Commission published a "Restrictions Roadmap under the Chemicals Strategy for Sustainability" which also mentions several groups of flame retardants, including phosphorous-based FRs. Therefore, pinfa reached out to the European Chemicals Agency (ECHA) to discuss the findings of the Peter Fisk report. In several web-meetings the views of pinfa and ECHA were exchanged and further information provided. ECHA is also working on an overall "Flame Retardants Strategy", expected for publication in early 2023. Here, pinfa provided technical information on reactive / polymer-bound and polymeric flame retardants.



PIN FRs and recycling

pinfa's Recycling Working Group, with leadership taken on by Corina Neumeister (Nabaltec), has accelerated actions in 2022, including a third-party analysis on opportunities and research needs, preparation of a document summarising available information on PIN FRs in plastics recycling, preparing a new round of recycling trials for 2023 and participating in conferences and workshops.

Source : 'PIN Flame Retardants and Recycling', pinfa brochure 2022
https://www.pinfa.eu/wp-content/uploads/2023/03/pinfa_PNO_Impact-of-PIN-FRs-on-plastic-recycling_202302.pdf

"pinfa members see recycling as a priority for the future of PIN FR. We need better data, both science and practical materials testing. pinfa members are keenly taking this forward, alongside downstream users and R&D experts."

Corina Neumeister
pinfa Recycling Working Group, Nabaltec

What do we know about PIN FRs and recycling?

pinfa prepared in 2022 a 20-page document summarising state-of-the art knowledge on PIN flame retardants and recycling. This looks at how PIN FRs impact plastics recycling, and also provides examples of recovery and recycling of PIN FRs and of use of PIN FRs to ensure safety of recycled materials. This includes easy-to-read summaries of

- Fraunhofer LBF – pinfa trials of multiple cycle ageing - mechanical recycling of various PIN FR – polymer compounds
- PNO expert perspective analysis (see below)
- Fifteen recent science publications covering:
  - trials of (mechanical, solvent) recycling of plastics or cables containing PIN FRs
  - applications of PIN FRs to enable recycling of end-of-life plastics, textiles …
  - use of materials recovered from wastes to produce PIN FRs
  - recycling of elements recovered from PIN flame retarded materials for other uses

"The work by Fraunhofer LBF with pinfa demonstrates compatibility of several PIN FR – polymer combinations with mechanical recycling."

Sabyasachi Gaan
Empa (Swiss Federal Laboratories for Materials Science and Technology)
at SPE Flame Retardant Week 2022, see pinfa Newsletter n°142.

"These tests showed that for nearly all the polymer / PIN FR combinations tested, fire performance was maintained after multiple ageing – re-extrusion cycles, but mechanical properties tended to deteriorate because of damage to the polymer and the glass fibres, not because of the flame retardant."

Rudolf Pfaendner
Fraunhofer LBF, see pinfa Newsletter n°s 109 and 105

Expert perspective assessment for PIN FRs in plastics recycling

pinfa commissioned a study from industry R&D advisory specialists PNO on market development opportunities and research data needs for PIN flame retardants in plastics recycling. PNO analysed nearly 100 publications and patents and interviewed six experts. They conclude that there is little published information on the impacts and fate of FRs in different plastics recycling processes (mechanical, chemical-solvent, chemical-pyrolysis). R&D has concentrated on separation of waste electronics plastics containing brominated FRs, because this is a legal obligation in Europe. The study expects both use of PIN FRs and end-of-life plastics recycling to increase. The main challenges for mechanical recycling are identified to be upstream collection and sorting, and degradation of the polymer itself under reprocessing: that is, not issues related to PIN FRs. The study recommends to cooperate with the value chain to develop data and studies on PIN FRs in end-of-life plastics, fate of PIN FRs in recycling processes, sorting of plastics containing PIN FRs (including for specific streams such as end-of-life batteries), separation and recycling of PIN FRs in chemical recycling.

"A study of the state-of-the-art and Impact of Phosphorous, Inorganic and Nitrogen Flame Retardants (PIN FRs) on recycling, taking into account the current and upcoming, legislation, policies, technologies and market developments"

PNO for pinfa, 2022
For more information please contact pinfa.

"PIN FRs are more and more considered the leading segment in the FR market … acknowledged to be the design choice in polymers to support recycling … There is momentum for PIN FR R&D initiatives focussed on recycling … Despite a growing market where PIN FRs are taking the largest share … there is an evident and reasonable information gap of knowledge."

PNO report for pinfa, 2022

Literature Topics Heatmap

The darker the green, the more publications identitfied for a given topic

Bisphenol A	Electronic Waste	Halogen FR/Brominated FR	High-Density Polyehylene and Polyethylene	Incineration and Combustion
LCA, Environment Pollution	Polymer, Organic and Inorganic Chemistry	Waste Recycling, Waste Management	Ammonium polyphosphate	Catalysis
Cellulose	Chemical engineering	Coating	Composite material	Elastomer
Ethylene	Extraction (Chemistry)	Extrusion	Fiber	Filler (materials)
Fire retardant	Flammability	Glass fiber	Intumescent	Materials Science
Melamine	Nanocomposite	Organophosphate	Phosphate	Phosphorous
Plasticizer	Polyester	Polypropylene	Polyurethane	Solid phase extraction
Solvent	Thermal decomposition	Thermal stability	Thermoplastic polyurethane	Triphenyl phosphate

Source : "Literature Topics Heatmap, from PNO study for pinfa, 2022

pinfa Communications

Widening our audience

pinfa continues to extend our worldwide audience, with fact-based communication which is credible and informative for industry and stakeholders.

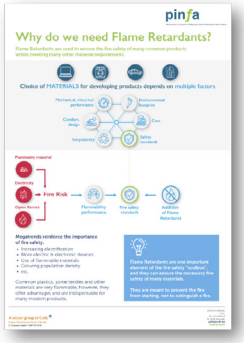
Eleven monthly pinfa Newsletters were published in 2022 (available on www.pinfa.eu) with information on new PIN flame retardant products and applications, fire safety, regulation and R&D. The Newsletter now has nearly one thousand subscribers, up from just over 800 in 2020. Email subscription is free on our website.

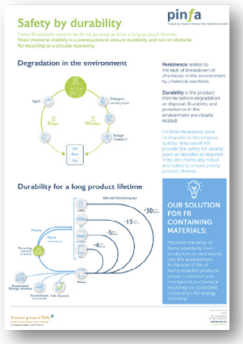
The pinfa website today has nearly 80 000 page views per year, doubled since 2017, and includes the pinfa Product Selector, access to pinfa publications and documents, and an up-to-date "Events" page listing meetings and conferences on fire safety and flame retardants worldwide.

pinfa's audience on social media is also growing with LinkedIn (350 followers, up to 4100 impressions per month) and Twitter (115 followers, up to 630 impressions per month).

Visual messages

pinfa has created two new infographics to visually explain key messages about PIN flame retardants and sustainability: Safety by Durability, Why Do We Need Flame Retardants? These are also explained in short videos (1 ½ minutes) https://www.pinfa.eu/media-events/videos/



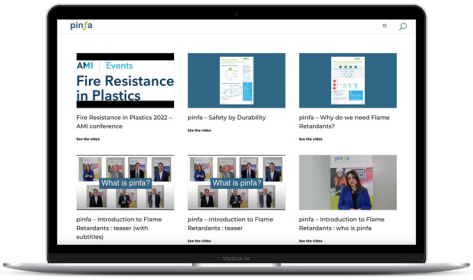


pinfa-Why-do-we-need-Flame-Retardants.pdf
pinfa_Safety-by-Durability_Persistence_Infographic.pdf

Video nuggets

In 2022, pinfa created six short member and pinfa staff interview videos (2 minutes): Who is pinfa? How flame retardants work? What is 'Essential Use'? Sustainability and circularity. Safety of flame retardants. Innovation. Six video interviews were made at the 17th AMI Fire Resistance in Plastics Conference. These are available on the pinfa website: www.pinfa.eu

https://youtu.be/ysAiSLzHDts
https://youtu.be/xn2Sh33y0bI



"Eco-Friendly Flame Retardant Additives and Materials"

pinfa and member companies spoke at the 3rd ECOFRAM Conference, Alès, France, 17-18 May 2022, linking today's research into bio-based materials as PIN flame retardants or synergists and industry tomorrow. The conference brought together over 90 participants. Short summaries of the 30 presentations and posters are in pinfa Newsletter n°139.

"PIN FRs can effectively enhance fire safety of sustainable materials. Fire performance was further improved by addition of organic bio-sourced materials."

Sandra Falkenhagen
BAM Germany

"The objective is to use local bio-resources in materials to reduce the environmental impact of the construction industry. … Non-halogenated solutions, for application by soaking in aqueous solution, have been identified …"

Lily Deborde
LGCGM Rennes University France

Engaging with downstream users

Both by organising our own events and by our presence at professional conferences, pinfa has extended engagement with the flame retardant value chain: compounders, polymers industry, OEMs and Tier 1 companies. For example:
pinfa organised a webinar on “Safe and Sustainable by Design (SSbD) Flame Retardants” (sessions on 27th, 28th and 30th June 2022) with speakers from pinfa, from Cefic and from key stakeholders (TCO, ChemSec, ChemForward) and a total of over 300 participants. Summary in pinfa Newsletter n°141.
pinfa-NA, with SPE (Society of Plastics Engineers), organised a first US National Week of Flame Retardants with one hundred participants (five online sessions, 22nd – 26th August 2022). Presentations and discussions covered non-halogenated flame retardant formulation, new PIN FR solutions, recycling, non-halogenated anti-drip agents and regulatory developments. Summary in pinfa Newsletter n°142.

pinfa presented at FRiP, the 17th AMI Fire Resistance in Plastics Conference (Cologne 28th - 30th November 2022), with over 150 participants from 22 countries. Nearly all of the conference presentations concerned PIN flame retardants and these are summarised in pinfa Newsletter n°144 (16 presentations), along with 17 interviews of compounders, polymer companies or downstream users, outlining their vision for future plastics fire safety and flame retardants.

Source: pinfa Newsletter n°144, summary of 17th AMI Flame Resistance in Plastics conference, Cologne, November 2022

"Google recognises the importance of flame retardants to ensure the safety of electronics products and systems. Google has already moved away from halogenated flame retardants as a class because of regulatory, customer, and market requirements, as well as their lifecycle health concerns."

Mike Werner
Google

"The TCO Certified Accepted Substance list (ASL), a public "positive list" of safer alternative flame retardants, today includes 22 PIN FRs."

Barton Finn
TCO Development

Source: [pinfa Newsletter n°141, summary of pinfa webinar on Safe and Sustainable-by-Design, June 2022]

What people said at AMI Flame Retardants in Plastics 2022

"Sustainability is a key objective for Sirmax and its customers, moving away from halogenated FRs, with demand for non-halogen recycled compounds."

Simone Lotteria
Sirmax

"We focus on halogen-free and low-halogen because PIN FRs can achieve fire safety and performance specifications more sustainably."

Pascal Wolfer
Lapp Engineering AG

"Developments of new products and research are today centred on non-halogenated FR solutions, e.g. for construction, transport, textiles."

Doron Sorek
Kafrit

"Avient is responding to customers' wishes to move 100% halogen-free and is developing new PIN FR solutions to combine this with performance."

Giulia Spezzati
Avient

"For Gabriel-Chemie, halogen-free is part of the company's sustainability priorities, so avoiding problem chemicals which can hinder recycling."

Angelo Bottaro
Erdal Karaagac, Gabriel-Chemie

Halogen-free flame retardants are developing extensively and innovative PIN FR systems enable applications in many industries."

Daniele Frasca
Lehmann&Voss

"BÜFA is specialised in high performance flame retardant solutions, mainly using PIN FRs for reasons of sustainability."

Peter Kornas
BÜFA

"Mineral PIN FRs are offering increasing fire performance and loading efficiency with new synergists and specialist mineral solutions."

Diego Tirelli
Lucia Campanelli, Nuova Sima

"Flame retardants are essential for Hager to ensure fire safety and to respect applicable product standards."

Patricia Lamouche
Hager Group

pinfa worldwide

pinfa North America

During 2022, pinfa North America started its second decade as a non-profit industry association. Due to its ongoing efforts, the name "pinfa" and the organization's educational mission concerning PIN FRs and fire safety has become familiar to many from industry and other stakeholders. At mid-year, pinfa-NA elected Carolyn Pressley of Budenheim as Chairman. Margaret Baumann and Tim Reilly from member companies FRX Polymers and Clariant respectively were elected Vice-Chairs while the treasurer role was filled by Keith Sorrell of Huber.

At the American Chemical Society Fire & Polymers Workshop in Napa Californa, Dr. Anteneh Worku (FR Adviser LLC, a pinfa-NA member) presented a paper entitled "The Road to Flame Retardant Commercialization". Anteneh's presentation was based on twenty-five years of personal experience in the FR industry, on both the FR producer and FR user side. Several workshop attendees stated that this was first time they saw a clear picture of the issues faced by both flame retardant solution providers and also flame retardant users concerning the many challenges needed to be overcome to bring a new FR product to market.

The pinfa-NA research support award will allow me to further commit to research and to partially support further development of bio-based PIN intumescent coatings.

James Covello
pinfa-NA Merit Scholarship at Case Western Reserve University

The pinfa-NA Outreach effort lead by Committee Chair Margaret Baumann had a productive year. A webinar prior to CAMX (Composites and Advanced Materials Expo) in Sacramento, California was organized. Roger Avakian (Avakian PolyChem) was the featured presenter (re. NHFRs for advanced composites). A four-day "Week of Learning" virtual event was organized by Society of Plastics Engineers Non-Halogen Flame Retardant Technical Interest Group via pinfa-NA members. This was a well-received and great success attended by approximately seventy-five persons daily. Also, pinfa-NA was actively present with our booth at multiple trade shows across the U.S.

Pinfa-North America has planned the year 2023 to disseminate much educational content provided by its committees. The Technical Program Committee has been working on different communication paths regarding the important role that flame retardant containing materials play in public fire safety. Additionally, an ongoing "virtual lunch and learn" free webinar series with content related to fire safety, technology and environmental & health topics wstarted in February 2023. pinfa-NA has started its second decade of efforts with its mission in mind

pinfa 10 Years North America
Phosphorus, Inorganic & Nitrogen Flame Retardants Association

Pinfa-NA was pleased to give back to the fire science community in the form of a $2,500 merit scholarship awarded to James Covello, a PhD student at Case Western Reserve University (Cleveland, OH). James has been involved with research into fire protection and design. Also, pinfa-NA members Roger Avakian (Avakian PolyChem) and Dr. James Zhou (Avient) supported and worked closely with CWRU engineering department to co-author a paper entitled: "Drip Suppressants in Halogen-free Flame Retardant Systems" (publication pending). The purpose of this study was to determine viability of different halogen-free replacements for fluorine-containing polymeric drip suppressants.

pinfa China

With the continuous impact of the COVID-19 epidemic in 2022, pinfa China's offline activities and communication projects were still greatly challenged.

We welcomed Javachem as a new member during 2022 and now pinfa China has 10 members. Zhejiang Javachem, who was founded in 2000, is a high-tech enterprise integrating sales and technical service, providing sustainable solutions like fluorosilicone polymers, silicone plastic additives, high-performance flame retardants, special modifiers for polypropylene and special functional masterbatches for the plastics industry.

To follow pinfa China's WeChat account, click the QR code

The communication program team of pinfa China has continually implemented media releases mainly via WeChat platform. In 2022, we have released 18 articles on the public account (1,367 followers, increased by 83%), including global flame retardant technology update, newsletters on the latest laws and regulations on PIN flame retardants, etc.

Meanwhile, pinfa China collaborated with industrial media platforms to expand influences by inviting external experts for a series of vitual online broadcastings. Six webinars focussed on sustainability policies, supply chain analysis especially downstream customers, carbon emission requirements, and thematic application seminars for E-mobility safety and intumescent fireproof systems. Over one thousand attendees participated in the webinar each time.

In August 2022, pinfa China sponsored the 2022 Advanced Polymer Materials and Fine Chemical Industry Development Forum which was hosted by CPCIF (China Petroleum and Chemical Industry Federation) and organised by the local government (Huaibei city). pinfa China provided three well-received presentations in the forum including "More sustainable safety FR solutions i", "FR standards and trends for cable applications", "Development of PIN FR glass fibre polypropylene". As one of major sponsors, pinfa China also provided the pinfa E&E brochure and giveaways with the pinfa logo.

pinfa China members in 2022 Advanced Polymer Materials and Fine Chemical Industry
Development Forum China, Huaibei, 25th – 27th Aug. 2022

"Pinfa China will be keeping working with partners and industrial stakeholders to advocate halogen free flame retardant solutions which can be contributed to build the sustainable, circular and resource-efficient industry."

Wayne Zhou
Executive chairman of Pinfa China

pinfa China founding members have aligned to build a local Chinese website based on the pinfa-EU website. The local language website will be essential to attract the attention of local customers, for PIN flame retardant products and applications, relevant standards and regulations, sustainability and health attributes. This new pinfa China website is estimated to go live in 2023 Q1 and to be perfected in year 2023.

In 2022, pinfa China started cooperation with colleges and universities for outreach projects. An essay competition activity on the subject of "Green FRs and halogen-free FRs" was launched in Q3 2022, co-orgnized with Beijing Technology and Business University. In total 28 texts and videos were submitted, of which 18 works finally won awards after discussion and selection by the committee of the event. Due to the impact of the epidemic, an online awards ceremony was held at the end of December. The award-winning works will be on the pinfa China website and WeChat official account and will be published as a collection.

With the end of the COVID epidemic in China 2023, pinfa China is actively looking forward to restarting more offline activities, including exhibitions, technical conferences and workshops (like those organised in 2018 and 2019) to create more communication in the future.
mission in mind

"As the member of both PINFA EU and PINFA China, Italmatch is willing to work with PINFA partners, provides more safe, high efficient PIN FR to the market, fulfil the different requirement of the customers."

Kevin He
Italmatch

pinfa China 2022 Q3 General Assembly Meeting
Qingdao, 22nd Sept. 2022

Meet the pinfa EU team

Dr Adrian Beard Chairman of pinfa

Adrian Beard works for Clariant Corporation, Hurth near Cologne in Germany, as Head of Marketing and Advocacy for the Flame Retardants Business Line of the Business Unit Additives. On top of his Clariant position, Adrian has been the Chairman of pinfa since November 2016. He is also a senior expert in fire safety and environmental properties of phosphorous based flame retardants. From 1991 to 1999, before joining Clariant, he was head of the environmental analytical laboratory at the Fraunhofer-Institute for Environmental, Safety, and Energy Technology in Oberhausen, Germany. He holds a doctorate in analytical chemistry from the University of Waterloo, Ontario, Canada and a diploma in geoecology from the University of Bayreuth, Germany.

Esther Agyeman-Budu Sector Group Manager

Esther Agyeman-Budu, has been working for the European Chemical Industry Council (Cefic) since April 2013 in the Innovation Policy unit as Communication and Emerging Science and Policy Issues Manager. In April 2019 she changed roles to become Sector Group Manager in the Specialty Chemicals unit of Cefic and is responsible for several sectors groups, including pinfa, the Phosphorous, Inorganic and Nitrogen Flame Retardants Association. Before joining Cefic, Esther was an undergraduate Communication Instructor at Kent State University. Previous experiences: Corporate Social Responsibility fellow at Johnson and Johnson and Marketing Specialist for Microsoft Business Solutions. Esther's background is in science and political communication, corporate social responsibility and information science.

Francesca Filippini Sector Group Manager

Francesca Filippini has been working for the European Chemical Industry Council (Cefic) from January 2021 in the Product Stewardship department managing regulatory and institutional affairs. In January 2022 she changed her role to become Sector Group Manager in the Specialty Chemicals unit of Cefic and she is responsible for several sector groups, including pinfa. Prior to joining Cefic, Francesca worked as legal support for a biomedical company and, before that, in a law firm. Francesca is Italian and she is a brilliant law graduate with a focus on criminal law.

Hannane Haddouch Assistant of pinfa

Hannane Haddouch is a sector group assistant for the Specialty Chemicals department of Cefic. Since 2011, she provides excellent administrative support to the Secretary General and the pinfa members.

Vincent Mans Technical Advisor

Vincent Mans coordinates with the European Commission and other stakeholders regarding issues on fire safety in building and construction, in particular for passive fire protection. He is a previous President of EAPFP (European Association for Passive Fire Protection) and of TECNIFUEGO (Fire Safety Association in Spain) and is an active member of UNE/CTN23, mirror committee of CEN/TC127 dealing with standards on reaction and resistance to fire of building elements. His degree is chemical engineer from the University of Barcelona, where he is based, and he has been working in research and technical applications of Phosphorous and Nitrogen based FRs for 40 years as Business Leader in Chemische Fabrik Budenheim.

Chris Thornton Consultant to pinfa for communications

Chris Thornton writes the pinfa Newsletter, which provides monthly information on PIN flame retardants and fire safety. He has been working with the flame retardants industry in Europe since 2001 on information and communications, fire safety, life cycle analysis, eco-labels, smoke toxicity and other flame retardant environment and health challenges. He is British born, now living in France. His other activities include sustainable management and recycling of phosphorous.

Ellen Mulder Cefic Communication

Ellen Mulder is a Communications Manager within the Public Affairs team of the European Chemical Industry Council (Cefic). Her current portfolio includes running Cefic's reputation campaign (ChemistryCan), and providing communications advice to Specialty Chemicals Sector Groups, the Programme Council Innovation and the Sustainability Forum. More specifically, since 2021 Ellen has supported pinfa with content and visuals for the Twitter and LinkedIn channels. As a Dutch national, she is also fluent in English and has a good working knowledge of French, German, and Spanish.

Myriam Goffin Cefic Communication

Myriam Goffin has been working with the European Chemical Industry Council (Cefic) since 2012. In 2022 she changed roles and moved from the Specialty Chemicals team to the Communications Department. As a Communications Manager, she collaborates with several sector groups including the Phosphorous, Inorganic and Nitrogen Flame Retardants Association (pinfa). Before Cefic, she was part of the Regulatory Affairs Department in a pharmaceutical company. Myriam holds a degree in translation (English and Spanish) from the Institut Libre Marie Haps (Brussels, Belgium).

pinfa EU membership

Full members

Any producer of Phosphorous, Inorganic or Nitrogen flame retardant chemicals is eligible for membership.
The membership includes a company's subsidiaries and joint ventures.

ADEKA

BASF
We create chemistry

Budenheim

CLARIANT

HUBER
NON-HALOGEN
FIRE RETARDANT ADDITIVES

ICL

Italmatch Chemicals

LANXESS
Energizing Chemistry

METADYNEA
METAFRAX GROUP

Nabaltec

SIBELCO

THOR

In 2022, pinfa EU welcomed a new member

IMERYS

Associate members

Associate membership is open to other related technologies, e.g. FR synergists, and to companies using Phosphorous, Inorganic and Nitrogen flame retardant chemicals (i.e. formulators, blenders, distributors, agents, end users).

For pinfa-NA and pinfa China members, see their websites

Mutual memberships

pinfa

Phosphorus, Inorganic & Nitrogen Flame Retardants Association

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A sector group of Cefic

European Chemical Industry Council - Cefic aisbl

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