pinfa
Phosphorus, Inorganic & Nitrogen Flame Retardants Association

Your newsletter for non-halogen fire safety solutions n° 176 November 2025

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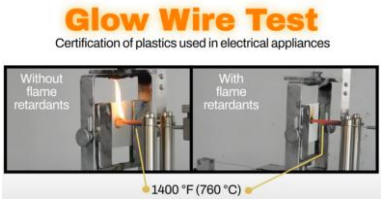
PINFA IN ACTION

Free webinar: fire performance without ATO

Wednesday 3rd December 17h30 CET. With Roger Avakian, Polyone and SPE fellow. New and alternative approaches to ensure fire safe formulation of PIN flame retardant thermoplastics, to achieve UL 94 V-0 no flaming drip test, without using antimony additives. The webinar will summarise relevant research literature, patents and supplier information on ATO replacement in thermoplastic applications, providing information for formulators and the plastics industry.

Free pinfa-NA webinar: Wednesday 3rd December 11:30 - 12:30 EST (USA) = 17h30-18h30 CET (Brussels time). pinfa-NA's 20th Lunch and Learn (L&L) webinar. Registration: https://us02web.zoom.us/webinar/register/WN_4S38XPacQvOlThQQrPT7UQ#/registration



pinfa-NA learning videos on flame retardants

pinfa-NA has compiled nine explainer videos on fire safety and flame retardants with summary wrap-up of main messages. The pinfa-NA explainer videos are 2-3 minute general public explanations of how FRs work, why FRs are used for fire protection, the importance of fire regulations, historical perspectives of FRs, how FRs act during different phases of a fire, environmental and health questions, safe alternative FRs, how FRs impact smoke and the logical justification for FR use. We are today surrounded by flammable materials in our everyday lives and FRs are one tool contributing to fire protection, and to the reduction in fire deaths in developed countries over the last fifty years. These pinfa-NA educational videos have already been viewed over a thousand times on YouTube and are also disseminated on other channels and shown at many trade shows and meetings.

pinfa-NA VOFR-CM (Value of Flame Retardant-Containing Materials) Explainer Video Series. Nine short videos and now 30-minute compilation video. https://www.pinfa-na.org/learnfrmaterials

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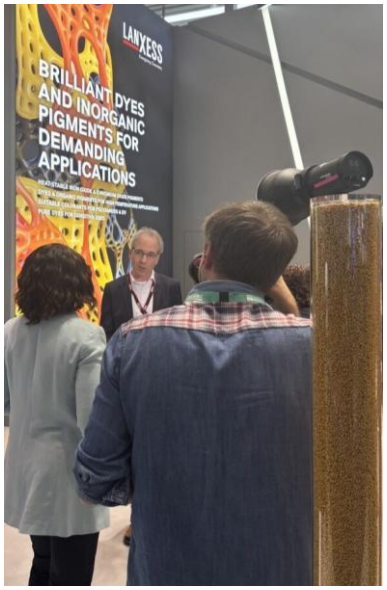


pinfa at K Fair K2025

pinfa members from across the world engaged with the plastics industry and innovation at K2025, 8-15 October, Düsseldorf. Testimonies on LinkedIn by Sander Kroon - ICL, Sebastien Grizard - William Blythe and Joachim Stricker – RadiciGroup explain how innovation is driving innovation in PIN flame retardants to ensure fire safety in tomorrow's performance materials. Adrian Beard, then pinfa Chairman (Clariant) participated in an Expert Panel on why additives are needed to enable plastics to bring the properties society needs in fast-developing areas such as mobility, urbanisation, medical … (watch online here). He underlined that innovation can deliver sustainable additives which ensure functionalities of plastics and are safe over their whole life cycle, including in recycling. In particular, flame retardants – which are needed in plastics for fire safety – are innovating to optimise sustainability.

K 2025 Expert Talk: Additives - Drivers of Performance and Progress
https://www.youtube.com/watch?v=gpaesoOi35A

pinfa on LinkedIn (1 000 + followers)
https://www.linkedin.com/company/pinfa-sector-group-of-cefic/

pinfa input to EU on affordable housing

pinfa input to the EU public consultation on the EU Affordable Housing Plan says it should strongly address fire safety. pinfa underlined the need for minimum fire safety standards to ensure that affordable housing is safe and resilient. Housing energy efficiency and fire safety reduce long-term householder costs, reducing energy costs, fire safety retrofits and fire costs. Fire safety costs can be optimised by EU fire safety standards and test methods for building materials (e.g. cladding), furnishings, energy systems used in buildings (e.g. photovoltaics). EU fire safety standards ensure optimal industry investment and drive materials innovation. pinfa input suggested that EU funds and renovation policies must include clear fire safety requirements. pinfa also notes that climate change and rising global temperatures are increasingly impacting fire safety also across Europe. Heatwaves and droughts increase fire risks in both southern northern Europe. This reinforces the need to strengthen fire safety standards for residential buildings, including public and social housing, under EU housing policies, in particular to better protect vulnerable communities.

"European affordable housing plan", public consultation closed 17th October 2025 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14670-European-affordable-housing-plan_en

See also pinfa presentation by Thomas Futterer, pinfa Chairman (Budenheim) "Why fire safety is essential in affordable and sustainable housing?" https://www.pinfa.eu/wp-content/uploads/2025/11/pinfa_EFSW_20251104_presentation_final.pdf

pinfa INEMI webinar on sustainable FRs

Adrian Beard, pinfa (Clariant) presented FR sustainability at INEMI Sustainable Electronics Tech webinar, 23rd October. He presented the active chemicals regulatory context in Europe, in particular actions on PFAS, REACH and Classification and Labelling, ECHA Flame Retardants Strategy, the Ecodesign and Sustainable Products Regulation. He outlined Cefic's work on Safe and Sustainable-by-Design (SSbD) chemicals, pinfa's work on defining what is a "sustainable flame retardant", and implications in terms of high uncertainty in innovation first stages. INEMI, the International Electronics Manufacturing Initiative, brings together organisations across electronics, with a combined revenue > US$ one trillion.

INEMI Sustainable Electronics Tech Topic Series: Answering the Burning Questions: Sustainable Flame Retardants, 23 October 2025
https://inemi.org/iNEMI/Events/Event_display.aspx?EventKey=06PINFATTS

pinfa slides: https://www.pinfa.eu/resource/flame-retardants-answering-burning-questions/

pinfa General Assembly

pinfa's members discussed how industry can address new challenges and information on PIN flame retardants. 29th – 30th November 2025, **Vincent Brugge, Vice-President Legal, and Managing Director of ICL Europe**, welcomed more than 30 participants (from 17 pinfa member companies), at the company's European headquarters in Amsterdam. He underlined that chemicals and other foundation industries face make-or-break challenges today, between the need to invest in sustainability and climate, and the challenges of energy prices and imports. For flame retardants, these challenges are particularly acute.

Regulatory, science and industry dialogue

Members were able to engage with **Nat Tonge and Claire Massey, UK Environment Agency**, who explained ongoing work into identification, risk assessment and exposure monitoring of FRs in the UK (follow-up of Scoping Review, see pinfa Newsletter n°172). This showed the benefit of cooperation with pinfa, which enabled clarification between substances which are indeed PIN flame retardants and substances being used for other reasons (e.g. plasticisers, processing agents).

pinfa members also dialogued with **Pim Leonard and Sicco Brandsma, Amsterdam Free University**, who reviewed recent publications on organo-phosphorus FRs environmental occurrence and bio-monitoring. This showed a rapidly increasing number of science publications globally, but concentrating on only a handful of FRs, in some cases halogenated. A challenge is that FRs are found everywhere, often at very low levels from background contamination. These levels may not pose health risks, but are often perceived as unacceptable.

Updates covered pinfa's Working Groups, covering EU regulatory developments, inorganic FRs, melamine-derivatives, phosphorus PIN FRs, recycling, standards, the EU Construction Products Directive and fire safety, ecotaxes, communications actions and events. Several technical studies are being undertaken or prepared between pinfa, member companies and downstream users. Actions of pinfa North America and pinfa China were presented.

New pinfa Executive elected

At the November 2025 pinfa General Assembly, the members elected a new Executive Committee, covering companies producing phosphorus-, inorganic- and nitrogen-based PIN flame retardants:

- Thomas Futterer (Budenheim): Chairman
- Adrian Beard (Clariant): Vice-Chair
- Zahra Fahimi (Huber): Vice-Chair
- Sander Kroon (ICL): Vice-Chair

Photo: the new pinfa Executive Committee, with Cefic pinfa managers Esther Agyeman-Budu and Francesca Filippini.

POLICY AND REGULATION

DBDPE (brominated FR) designated SVHC

ECHA has decided to identify the brominated flame retardant DBDPE as Substance of Very High Concern because of its very persistent and very bioaccumulative properties (vPvB). The decision was taken by ECHA's Member States Committee (MSC). DBDPE was then added to the Candidate List (Annex XV of REACH) by ECHA on 5th November 2025. The brominated flame retardant DBDPE was introduced in the 1990's as a drop-in substitute for the chemically very similar brominated flame retardant "DecaBDE" (Decabromodiphenyl ethane to replace decabromodiphenyl ether) and has been cited in the ECHA Flame Retardants Strategy as an example of 'Regrettable Substitution' (see pinfa Newsletter n°147). Other jurisdictions are also engaging regulatory actions on DBDPE (e.g. Canada, see pinfa Newsletter n°169)

"Highlights from ECHA's Member State Committee October meeting", ECHA/NR/25/32, 9th October 2025, Item 8 - SVHC identification - Seeking agreement on Annex XV proposals for identification of SVHCs 1,1'-(ethane-1,2-diyl)bis[pentabromobenzene] (EC No 284-366-9) https://www.echa.europa.eu/-/highlights-from-echa-s-member-state-committee-october-meeting

"ECHA adds one hazardous chemical to the Candidate List", 5th November 2025, ECHA/NR/25/35 https://echa.europa.eu/-/echa-adds-one-hazardous-chemical-to-the-candidate-list-2

Cefic Particles Platform

Inorganic PIN FRs are concerned by current discussions around safety and regulatory classification of particles. The European Court of Justice recently annulled the Classification of titanium dioxide (see pinfa Newsletter n°173) and talcum powder (talc) has been designated by IARC as possibly carcinogenic … Industry and many experts argue that effects of poorly soluble low toxicity minerals PSLTs), which result from small particle size, should not lead to classification. A workshop organised by the Cefic Particles Platform, 2nd October 2025, brought together over 200 participants in Brussels and online, including representatives of over 20 EU and Member State regulatory authorities/agencies. The workshop discussed developments in understanding of how lungs react to inert particles, extrapolation of rodent studies to humans, implications for appropriate risk assessment and regulation.

Cefic Particles Platform https://www.particlesplatform.eu/

Workshop ""A Proportionate approach to the regulation of particles based on the latest science", 2nd October 2025
https://www.particlesplatform.eu/news/2025-particles-platform-workshop/

COMMUNICATIONS AND MEDIA

R&D award winner: FRs to limit fires

Dow researcher into fire retardant materials, Richard Tapper, is R&D World's R&D Technician of the Year 2025 (R&D World 100 Professional Awards 2025). Tapper develops and tests fire retardant wire and cable formulations, often non-halogenated, for applications from household to grid-scale, and recently including polymer composites for cables for solar farms. "It's straightforward to follow the standards," he says, "but to see past that to the application, is a huge motivating factor for me. When I approach a test, I am considering that this cable is on fire in my house. So, I am going to view the test performance objectively". Tapper underlines the ubiquity of electrification, leading to a need for flame retardant, insulating materials to reduce risks, noting the regulatory requirements and evolving standards can catalyse innovation.

"2025 R&D Technician of the Year: Dow's Richard Tapper pushes flame-retardant limits to curb real-world fire risks", R&S World Online, 12th September 2025 https://www.rdworldonline.com/2025-rd-technician-of-the-year-dows-richard-tapper-pushes-flame-retardant-limits-to-curb-real-world-fire-risks/

LEADERSHIP

Young scientist pioneers fire safe materials

Nigeria newspaper 'Leadership' interview points to fire safety and performance of sustainable non-halogenated FRs. The interview of Abdulwasiu Muhammed Raji, Nigerian young scientist, currently working on a PhD in France cites his motivation for solving real-world problems, protecting people, preserving the environment and bridging innovation between Africa and global research. His work has included developing fire-resistant foams for furniture with lower smoke and toxicity, non-halogenated intumescent PIN flame retardant systems, and also low-emission aviation fuels. He underlines that non-halogenated flame retardants can today achieve or even exceed industrial standards and the need for fire safety in homes and buildings (including informal urbanisation) and in public transport in Nigeria.

"Why I'm Pioneering Fire-Safe Materials And Greener Fuel Solutions – Scientist", Leadership, Nigeria https://leadership.ng/why-im-pioneering-fire-safe-materials-and-greener-fuel-solutions-scientist/

RESEARCH AND INNOVATION

PIN FR laser-weld PBT for electric vehicles

Sabic (pinfa member) has launched the world's first laser-weldable flame retardant PBT compound. The performance glass fibre reinforced PBT (polybutylene terephthalate) compound can replace metal for demanding applications such as EVCUs (electric vehicle control units) which protect sensitive electronics from fire, smoke, impacts and moisture, and also for vehicle exterior parts, electrical and electronic components. The compound offers colorability, low warpage, electrical insulation, high dimensional stability, chemical resistance and fire resistance (UL 94 V-0 @ 1.5 mm). Because the compound offers high optical transmission (20% @ 3 mm) it can be bonded to absorptive materials by laser-welding, avoiding use of adhesives, chemicals, fasteners or vibration, so simplifying part design and accelerating manufacture throughput. The compound is an Edison Award winner for global innovation - Critical Safety Material Advancements (2025 silver).

"SABIC's new LNP™ THERMOCOMP™ compound with non-halogenated flame retardance helps boost EVCU safety and protection", 12th August 2025 https://www.pressreleasefinder.com/SABIC/SABICPR747/en/

Technical data https://www.sabic.com/en/products/specialties/lnp-compounds-and-pc-copolymer-resins/lnp-thermocomp-compound

PIN FR performance solution for PBT

Envalior (pinfa member) has launched a non-halogenated PBT with high electrical resistance and physical performance. The non-halogenated PIN FR polybutylene terephthalate (PBT) achieves CTI A 600V (IEC 606112), meeting the highest insulation class (IEC 60664-1, including when coloured EV orange) and UL 94 V-0 @ 0.75 mm fire performance. Properties include dimensional stability, low electro-corrosion, electrical insulation at high temperatures, hydrolysis resistance, creep resistance and elongation at break comparable to polyamides. Compounds are available with and without glass fibre reinforcement. Applications include e-vehicles for high-voltage charging (800V), secondary supply for hybrid vehicles, electrical components and housings and data centres.

"New PBT from Envalior … sets standard for high-voltage applications", 8th October 2025 https://www.envalior.com/en-us/insights/press-release/new-pbt-from-envalior-debuting-at-k-2025

Polymeric PIN FR for polyethylene (PE)

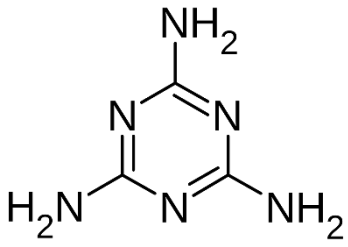
Avient (pinfa member) has launched a new line of non-halogenated polymer FRs for low-smoke fire performance. In polyethylene, UL 94 V-0 down to 1.5 mm is achieved, combined with low heat release rates over time. The polymeric PIN FRs are delivered in masterbatches in a range of PE resins. Applications include transport, building and construction, electrical appliances, consumer goods. In one case study, ASTM E84 Class A fire safety is achieved in extruded PE building interior panels, with healthy building certification, dimensional stability and aesthetic quality.

"New Cesa™ MAX Flame Retardant Additives Developed by Avient for Strict Industry Standards", 16th September 2025 https://www.avient.com/news/new-cesa-max-flame-retardant-additives-developed-avient-strict-industry-standards

Trinseo PIN FR solutions for electronics

New performance plastics compounds from recycled polymers using non-halogenated flame retardants and no PFAS. Speciality materials solution provider, Trinseo, has developed compounds based on polycarbonate blended with other selected polymers, achieving UL 94 V-0 (1.5 mm) or V-2 (0.5 mm) with 95% post-consumer recycled content, using non-halogenated (PIN) flame retardants and without PFAS. The compounds offer dimensional stability, toughness and impact strength, a wide processing window, UV resistance, colour and aesthetic quality, and resistance to water. The compounds are particularly adapted to applications in consumer electronics and electrical equipment, IT, battery chargers and voltage stabilisers.

"Trinseo Introduces Groundbreaking Flame-retardant Plastic Grades Without Using PFAS Additives During Manufacturing Process", Trinseo, 9th April 2024 https://investor.trinseo.com/home/news/news-details/2024/Trinseo-Introduces-Groundbreaking-Flame-retardant-Plastic-Grades-Without-Using-PFAS-Additives-During-Manufacturing-Process/default.aspx

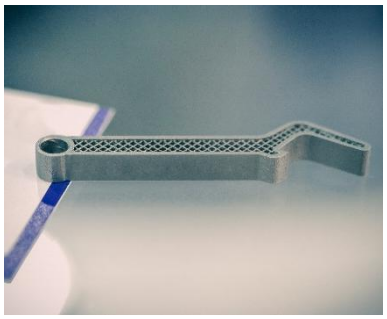


Quantification of melamine and derivatives

Study demonstrates analytical method for quantifying melamine and its breakdown products in water. The developed method used analysis by high-performance liquid chromatography–tandem mass spectrometry (HPLC-MS/MS) with chromatographic separation by hydrophilic interaction liquid chromatography (HILIC). Tests looked at analysis of melamine itself and of breakdown products and precursors derivatives ammeline, ammelide,,cyanuric acid, cyromazine and hexa(methoxymethyl)melamine. Limits of quantification of 0.1 – 1 µg/L and limits of detection of 0.01 – 0.05 µg/L for the different compounds, showing good recovery, repeatability and linearity, applicable in both surface waters and wastewaters. Depending on the required sensitivity, evaporation could be used to concentrate samples.

This research was funded by the former European Melamine Producers Association (EMPA).

"Development of a Sensitive HILIC-MS/MS Method for Quantification of Melamine, Derivatives, and Potential Precursors in Various Water Matrices", M. Käberich et al., Analytica 2025, 6, 27.
https://doi.org/10.3390/analytica6030027



Hewlett Packard – Evonik PIN FR 3D-print

HP and Evonik SLS 3D-print powder offering 60% reusability, print quality and UL 94 V-0 (2.5 mm) fire performance. The print powder, designed for powder bed fusion technologies, e.g. SLS (selective laser sintering) 3D printers, such as Hewlett Packard JetFusion range, are based on polyamide PA12 with non-halogenated flame retardants. The 55 µm particle-size powder with encapsulated additives, such as carbon black, ensures flowability and homogeneous sintering, pigmentation uniformity with high quality, smooth aesthetic finish and fine detail, dimensional accuracy printing. Printed parts achieve UL 94 V-0 at 2.5 mm, V1 at 1.8 mm and HB at 1 mm and CTI 408 / 423 (XY / Z). The 60% powder reusability significantly reduces print costs per finished part

"Evonik unveils flame retardant PA12 and carbon black embedded 3D-printable powders at Frankfurt trade", 14th November 2024
https://www.evonik.com/en/news/press-releases/2024/11/evonik-unveils-flame-retardant-pa12-and-carbon-black-embedded-3d.html

"HP 3D High Reusability (HR) PA 12 FR, enabled by Evonik"
https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=4AA8-4683ENW

Review on aluminium composite panels

Covering research into aluminium composite panels (ACP) materials, fire and thermal performance, installation, costs. Over 2200 publications were identified, of which 180 were selected and analysed, including research papers, standards, patents. ACPs are widely installed to protect buildings from weather (cold, heat, wind, rain, humidity) and to improve aesthetics. They have an aluminium structure, air cavities and an insulating core, which can

be based on either polymers (polyethylene, polyurethane, polyisocyanurate, polystyrene) or on honeycomb or fibre-cement materials. Fire classifications of panels in different jurisdictions are compared. Thermal insulation performance, density (weight), bonding and attachment systems, fire behaviour and mechanical properties (structural resistance to fire are summarised, as are different flame retardant solutions. Challenges identified include delamination in fire (failure of bonding, particularly for non-combustible materials), weight of non-combustible materials, end-of-life recycling, production of cores from secondary materials, lack of data on thermal performance of non-combustible core ACPs, low smoke toxicity flame retardants for polymer cores.

"A Comprehensive Review of Aluminium Composite Panels", M. Hasnat et al., J. Compos. Sci. 2025, 9, 319. https://doi.org/10.3390/jcs9070319

PIN FRs for 3D-printing with natural fibres

PIN flame retardants were successfully tested in innovative 3D-printing using continuous fibre/polymer yarns. Bio-based yarns (flax fibre, viscose – which is derived from cellulose) were co-extruded with PLA (polylactic acid) then tested in FFF (fused filament fabrication) 3D-printing (ATMAT Saturn 3D-printer). PIN FRs tested were, for the PLA polymer: ammonium polyphosphate (30% loading, APP microencapsulated in melamine) and for the fibres: ammonium sulphamidate, sulfamic acid and an Oekotex-accepted organosphosphorus-nitrogen PIN FR. The 3D-printed material achieved UL 94 V-0 (4 mm) with the PIN flame retardants and LOI up to 34% (limiting oxygen index). Peak heat release rate, determined using micro combustion calorimetry, was reduced by up to -50% compared to non-FR yarns. In the printed composites the main effect was due to the APP-rich PLA shell of the filaments. Future work is focused on increasing the fibre volume of the printed composites.

Photo: copyright Fraunhofer WKI.

"Flame-retardant treatments of continuous flax fibres and rayon rovings: a novel approach for 3D-printing applications", A. Schirp et al., Polymer Degradation and Stability, vol? 243, Jan. 2026, 111746 https://doi.org/10.1016/j.polymdegradstab.2025.111746

PUBLISHER INFORMATION

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