

Stakeholder meeting on fire safety in EU Horizon Europe	1	UK to ban flammable cladding on tall buildings	7
Workshop on design for fire safety in green electronics	1	EU initiatives on chemicals and recycling	7
IAFSS Agenda 2030 for a Fire Safe World	2	ECHA list of chemicals used as flame retardants (FRs)	8
ESFSS European Symposium on Fire Safety Science	3	EU project assessing new RoHS substance restrictions	8
Effects of different flame retardants in PBT polymer	4	EU Ecodesign criteria for display screens	8
Fires in office chairs in different contexts	4	Fire deaths in the USA not decreasing	9
A Schulman develops new PIN FR rotomolding PE	4	ATH reduces heat and smoke from thermoplastic rubber	9
EU Fire Information Exchange Platform meetings	5	California bans non-inorganic FRs in furniture	10
European approach to façade fire performance	5	PIN FR synergies in ABS	10
EU impact assessment cites fires safety statistics	6	ChemSec launches chemical substitution tool	10
EU Parliament initiative on fire statistics	6	R&D: bio-based phosphorus FRs for polyurethanes	11
US firefighter cancer registry	6	Other News	11

**European initiatives on fire safety:** to date, fire safety regulation has been largely left to the responsibility of EU Member States. However, some important European initiatives have been taken, for example EU fire and smoke standards for railways (EN 45545) and the EU Construction Products Regulation. The latter defines EuroClass fire performance standards for materials and products, but leaves to Member States the responsibility of defining what EuroClass they specify in different buildings and applications. On the other hand, Europe does not collect fire safety statistics, and has not fixed minimum fire safety requirements in many sectors, e.g. not even for hotels where travellers might expect to enjoy coherent safety levels across Europe (see pinfa Newsletter n°51). Concerns expressed by members of the European Parliament and by stakeholders following the Grenfell Tower catastrophe last year may however bring changes. The European Commission is working on the fire safety of building façades, and has also launched the EU Fire Information Exchange Platform (FIEP) which has now established working teams. MEPs continue to push initiatives to promote better integration of fire safety into EU policies. In this context, the IAFSS (International Association for Fire Safety Science) is launching, **Brussels 3<sup>rd</sup> December, an initiative to include fire safety in the EU's "Horizon Europe" research and technology programme** [REGISTER HERE](#) (whereas it is largely absent in Horizon2020) and to discuss an "Agenda 2030 for a Fire Safe World".



### Stakeholder meeting on fire safety in EU Horizon Europe

Brussels 3<sup>rd</sup> December 2018. To discuss fire safety in the EU's research and technology in Horizon Europe (100 billion €, 2021-2028, see pinfa Newsletter n°93) and the global IAFSS "Agenda 2030 for a Fire Safe World" (see below in this pinfa Newsletter). With support of ISO TC92, CEN/CENELEC, pinfa, Brandforsk, Kingspan, Modern Building Alliance, NFPA and Rockwool.

Registration <https://www.eventbrite.co.uk/e/workshop-to-define-a-fire-safety-mission-for-europe-registration-50848694815>

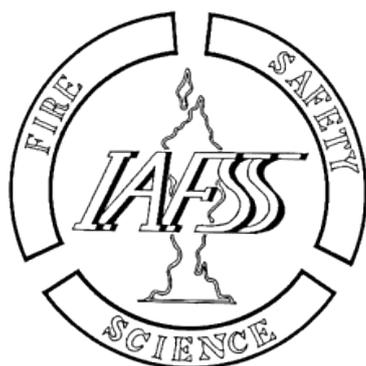


### Workshop on design for fire safety in green electronics

San José, California, 30 April – 1 May 2019. Day 1 will provide an overview of flame retardants, fire testing and formulation for electrical and electronic applications, with presentations by Alex Morgan (UDRI), testing and standards organisations and compounders. Day 2 will discuss emerging flame retardant needs for green materials for electronics applications, resulting from developments in performance and fire testing requirements and sustainability specifications, with OEM and component manufacturer perspectives.

Abstract submission: [rweiler@amfine.com](mailto:rweiler@amfine.com)  
Further information and registration [dwagner@pinfa-na.org](mailto:dwagner@pinfa-na.org)





## IAFSS Agenda 2030 for a Fire Safe World

IAFSS (International Association for Fire Safety Science) is developing a White Paper on global research needs to support fire safety for tomorrow. Content and objectives were discussed at a Workshop in Nancy, France, 11<sup>th</sup> September 2018, back-to-back to the ESFSS ([European Seminar on Fire Safety Science](#), see below). The IAFSS “Agenda for a Fire Safe World 2030” aims to engage dialogue with other fire safety research organisations, with engineers, architects and industry and with other stakeholders concerned by fire safety, and also to serve as a global basis for the development of regional fire safety research “agendas”. In particular, in Europe, the IAFSS input can contribute to identifying fire research needs or to propose a fire safety “Mission” within the EU’s ‘Horizon Europe’ (FP9) funding programme which is currently under definition.

At the IAFSS Workshop to discuss this draft Agenda, **Adamantia Athanasopoulou, Joint Research Centre of the European Commission** (Safety and Security of Buildings Unit), noted that ongoing work is underway to improve EU support to fire protection in the construction sector, despite the important fact that implementation remains the competence of Member States. The EN Eurocodes i.e. the EU standards for the structural design of buildings and other construction works, already cover fire structural design. The JRC 2008 report on needs to achieve improved fire protection via the EN Eurocodes remains a key reference. CEN (the European Standardization Committee) is mandated by the European Commission ([Mandate M/515](#), 12/12/2012) to publish the second generation of the EN Eurocodes (integrating, among other issues, a fire safety engineering approach) by 2020.

**Birgitte Messerschmidt, Director of Applied Research at the US National Fire Protection Association**, underlined the need to bring fire safety to public and stakeholder perception, and make it relevant to today and tomorrow’s society, with entry points such as health and economy. This requires engagement with other areas of science, with fire safety engineering, with regulators and standards.

Discussion was then organised in round tables and a panel discussion led by **Margaret McNamee** (McNamee Consulting, IAFSS Treasurer) with **Tuula Hakkarainen** (VTT Finland), **Peter Johnson** (ARUP Australia), **Brian Meacham** (Meacham Associates, IAFSS Secretary and US TAG to ISO TC92 SC4 Fire Safety Engineering) and **Patrick van Hees** (Chair of IAFSS, Lund University and Chair of ISO TC92). Participants proposed the following as examples of important societal challenges or topics in need of continued research in support of fire safety:

- Climate change
- Wildfires (causes, prevention, intervention)
- New materials and materials fire behaviour
- Urbanisation and increasing world population / globalisation / cultural differences
- Ageing population and social integration
- Artificial intelligence / smart buildings and transport / big data / automation
- Sustainability and toxicity
- Economic full costs of fire / cost-benefits of fire prevention
- Fire safety as one of many aspects of materials or building performance
- Need for systems thinking
- Need for data to support models

"M/515 Mandate for amending existing Eurocodes and extending the scope of structural Eurocodes", <http://ec.europa.eu/growth/tools-databases/mandates/index.cfm?fuseaction=search.detail&id=523#>

"Needs to achieve improved fire protection as regards the implementation and development of the EN Eurocodes. Support to the implementation, harmonization and further development of the Eurocodes", J. Kruppa et al., JRC, EUR 23523 EN – 2008 <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/needs-achieve-improved-fire-protection-regards-implementation-and-development-en-eurocodes>

IAFSS discussion paper for the 11<sup>th</sup> September workshop on an Agenda for a Fire Safe World, ENSIC Nancy, France "Research in support of fire resilient societies" (4 pages) <https://iafss.org/wp-content/uploads/IAFSS-White-Paper-June-25.pdf>

Selected items from the background reading for this IAFSS workshop:

- The EU needs a fire safety strategy, Fire Safe Europe, 2017 (26 pages)
- Reducing the Risk of Fire in Buildings and Communities: A Strategic Roadmap to Guide and Prioritize Research <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1130.pdf> (171 pages)
- Research Roadmap for Reducing the Fire Hazard of Materials in the Future (54 pages) <https://nvlpubs.nist.gov/nistpubs/specialpublications/NIST.SP.1220.pdf>
- International R&D Roadmap for Fire Resistance of Structures: Summary of NIST/CIB Workshop (138 pages) <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1188.pdf>
- WUI Fire Research Roadmap (Wildfire Urban Interface) (117 pages) <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1150.pdf>
- SFPE Research Roadmap "Research needs for the fire safety engineering profession" 2018 (67 pages) [https://cdn.ymaws.com/www.sfpe.org/resource/resmgr/roadmap/180703\\_SFPE\\_Research\\_Roadmap.pdf](https://cdn.ymaws.com/www.sfpe.org/resource/resmgr/roadmap/180703_SFPE_Research_Roadmap.pdf) and extract (5 pages) [https://cdn.ymaws.com/www.sfpe.org/resource/resmgr/docs/roadmap/SFPE\\_Research\\_Roadmap.pdf](https://cdn.ymaws.com/www.sfpe.org/resource/resmgr/docs/roadmap/SFPE_Research_Roadmap.pdf)

ESFSS  
2018



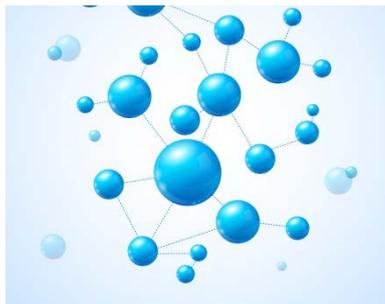
## ESFSS European Symposium on Fire Safety Science

Some 130 scientists working in fire science, in universities, technical and engineering organisations and industry, met in ENSIC (French National Higher Institute of Chemical Industries), Nancy, France, 12-14 September 2018. The conference included 35 papers and 50 posters on material and structure fire behaviour, fire and smoke dynamics, fire suppression, evacuation and wildland fires.

The keynote opening talk by **Guillermo Rein, Imperial College London**, underlined the importance of smouldering fires, both in nature (underground peat fires which smoulder for thousands of years) and in human installations. Smouldering fires are the main cause of home fires, causing a quarter of fire deaths. They are easy to ignite, hard to detect, generate toxic smoke (low oxygen leading to partial decomposition compounds) and can suddenly and unpredictably change to a full flaming fire. Smouldering fires pose particular risks in aircraft (in hidden volumes), in industry and storage, and in biomass and waste.

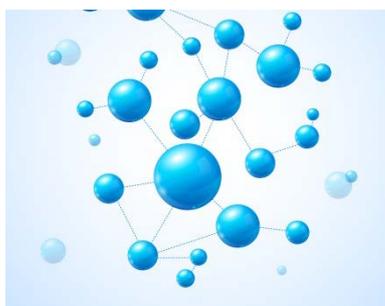
Several presentations showed work to better understand the physical and chemical processes of intumescent systems to protect steel in fires, and of flame retardant systems in polymers. Modelling these processes can enable improvement of fire protection products and better application in buildings to achieve fire safety requirements. Presentations on testing methods and modelling covered fire performance of woods and CLT (cross laminated timber) beams, vertical wall materials and wall claddings / ETICS (external thermal insulation composite system facades) / ACM (aluminium composite material) wall panels, intumescent coatings, aeronautical composites, fire and smoke development and fire extinguishing in buildings (internal and external), in tunnels and in industrial contexts, as well as wildfires. Studies presented also looked at how fire development can increase pressure in sustainable buildings (low ventilation / airtight / passive houses).

European Symposium on Fire Safety Science (ESFSS), ENSIC (Ecole Nationale Supérieure des Industries Chimiques), Nancy, France, 12-14 September 2018 <http://www.esfss2018.com/>



## Effects of different flame retardants in PBT polymer

At ESFSS (above), two studies underway with BASF analysed different flame retardants in PBT polymer. **Nils Roenner, Imperial College London**, showed in PBT the physical material fire behaviour impacts of 20 µm hollow glass nanospheres (which insulate and slow heat transfer into the polymer) and 50 µm boron nitride platelets (which accelerate heat transfer), and resulting changes in fire test results. **Isaac Leventon, NIST USA**, compared in glass fibre reinforced PBT the fire behaviour of polybrominated (+antimony) vs. phosphorus-based (+melamine) flame retardant systems. Both FR systems achieved self-extinguishing in a UL94 type set-up. In the brominated system, the flame remained regular, but self extinguished by “lift-off” from the polymer surface (gas phase FR action). In the phosphorus system, initial ignition was not retarded, but the flame before self-extinguishing was irregular (burning only through cracks in the char development) and had lower heat. **Elani Asimakopoulou, FireSERT Belfast Northern Ireland**, presented testing of inorganic “smart” FRs (magnesium – aluminium layered double hydroxides, and ZrP (zirconium phosphate) in polyisocyanurate (PIR) foam insulation materials.



## Fires in office chairs in different contexts

Also at ESFSS (above), **Jaeyoung Lee, Tokyo University**, et al., compared fire development in lobby chairs in compartment vs. open office space. Chairs weighed nearly 11 kg, and were constructed of steel, wood and polyurethane foam (PUR) with PVC covering. In the compartmentalised space (2.2 x 3.5 m room), fire spread from one chair to another was through thermal radiation and a temperature of 1000°C was reached with three chairs in less than 10 minutes. In the open setting, fire spread was by contact between chairs, temperature development was irregular (chair by chair) and a maximum temperature of 600°C was reached after around 15 minutes.



## A Schulman develops new PIN FR rotomolding PE

Pinfa member company, A. Schulman, leading international supplier of high-performance plastic compounds, composites and resins, has developed a new PIN flame retardant polyethylene compound powder for rotomolding offering UL94 V-0 fire performance. Rotational molding (rotomolding) is a specific plastics production process where the plastic is input as a powder (not pellets) and melts in the mold (rather than being input into the mold as a hot liquid) with a mold with biaxial rotation (rotated simultaneously in two planes) so enabling low operating pressures, cheap and simple molds. This results in stress-free items with well controlled wall thickness and very low plastic wastage. Applications include storage tanks, containers, industrial and automotive parts, toys, sports equipment, amongst others, both large and small and with complex shapes. A. Schulman’s new PIN FR polyethylene rotomolding compound combines fire performance and processing qualities with non-halogenated formulation.

*“More safety for rotomolding applications – A. Schulman launches new halogen-free PE flame retardant grade”, 12 June 2018 <https://www.aschulman.com/newsroom-press-releases/a-schulman-launches-new-halogen-free-pe-flame-retardant-grade>*



## EU Fire Information Exchange Platform meetings

The second and third meetings of the European Commission's Fire Information Exchange Platform (FIEP) took place on 29<sup>th</sup> June and 14<sup>th</sup> September. The FIEP was established in late 2017 (see pinfa Newsletter n°86), following European Parliament pressure after the Grenfell Tower fire. The meetings included presentations of fire safety campaigns and actions in different Member States. DG GROW (Unit C1) has contracted to Efectis to form the Technical Secretariat for the FIEP and to work on five projects: PT1: exchange of experience from fire accidents, PT2: regulatory approach for new products and high-rise buildings, PT3: the application of fire prevention principles, PT4: the use of fire engineering approach in building regulations and PT5: common terminology and fire statistics, with a cross-cutting priority of domestic fire safety. Activities in PT1 and PT3 have already started. The objective of the FIEP is to motivate each Member State (MS) to actively take part in a dialogue, while keeping objectivity and transparency, with the objective that domestic fire safety should increase".

Update on the EU Fire Information Exchange Platform (FIEP), G. Katsarakis, DG GROW C1, February 2018 [http://www.modernbuildingalliance.eu/wp-content/uploads/2018/05/FIEP\\_update\\_DGGrow\\_Feb2018.pdf](http://www.modernbuildingalliance.eu/wp-content/uploads/2018/05/FIEP_update_DGGrow_Feb2018.pdf)

Efectis announcement of contract for the EU FIEP: <http://efectis.com/en/fire-information-exchange-platform-fiep/>



## European approach to façade fire performance

The European Commission (DG GROW) has published a report proposing a European approach to assessing the fire performance of building façades. The report by RISE, BAM, BRE, Efectis and EMI, is the result of ten years of work, aiming to develop a common assessment method across the EU, taking into account Member States' existing classification systems and enabling them to maintain their current safety level requirements. It follows the EOTA Draft Technical Report and the 2014 NFPA report which concluded that large-scale fire tests are needed. The new report includes a summary of current regulations and test methods in 31 European countries. It proposes the existing BS8414 and DIN4102-20 test methods, plus an alternative test based on these but modified, and suggests performance classification criteria for each method. Classifications would only be valid for the whole façade system, classification of materials or single units would not be possible. Further research needs identified include validation for new types of façade systems, investigation of effects of exterior factors (wind, external fires), clarification of test fire sources, of mounting of thermocouples and of measurement of heat exposure.

"Development of a European approach to assess the fire performance of façades, 370 pages, RISE, BAM, BRE, Efectis and EMI for the European Commission (DG GROW, Unit C1, ISBN 978-92-79-88000-1 <http://dx.doi.org/10.2873/954759>

NFPA 2014 "Fire Hazards of Exterior Wall Assemblies Containing Combustible Components" <https://www.nfpa.org/News-and-Research/Fire-statistics-and-reports/Research-reports/Building-and-life-safety/Fire-Hazards-of-Exterior-Wall-Assemblies-Containing-Combustible-Components>

EOTA Draft Technical Report (not published) "Large-scale fire performance testing of external wall cladding systems" see Kotthoff & Riemesch-Speer 2013 <https://doi.org/10.1051/mateconf/20130902010>



## EU impact assessment cites fires safety statistics

The European Commission's "Impact Assessment" accompanying the proposed updates of EU regulations for the single market, competitiveness and European statistics mentions the need for European fire safety statistics. Of over 4 500 respondents to the public consultation (January – March) on these themes, only eight commented on European statistics, and five of these noted the "lack of comparable statistics on fire safety across Europe". However, the Commission's proposed Regulation (7<sup>th</sup> June 2018) makes no mention of fire safety statistics, because it does not define thematic areas for European statistics.

*European Commission proposal, refs. COM(2018) 441 final and 2018/0231 (COD), 7<sup>th</sup> June 2018, for a regulation "establishing the Programme for single market, competitiveness of enterprises, including small and medium-sized enterprises, and European statistics and repealing Regulations (EU) No 99/2013, (EU) No 1287/2013, (EU) No 254/2014, (EU) No 258/2014, (EU) No 652/2014 and (EU) No 2017/826" <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018PC0441&from=EN>*



## EU Parliament initiative on fire statistics

Two draft amendments (n°s 152 = ITRE/6385 and BUDG/4026) were submitted to the European Parliament proposing to engage a European pilot project aiming to identify actions to improve data and statistics for fires and fire prevention, and to engage actions to promote domestic fire safety and fire safety in building renovation. These were submitted by Bendt Bendtsen (EPP, Denmark) and more than 20 other MEPs (EPP, S&D, ECR, ALDE and Greens). Amendment 6385 was approved by ITRE (Industry, Research and Energy) Committee on 10<sup>th</sup> July and then 4026 was approved by the Budget Committee (BUDG) on 25-27<sup>th</sup> September (with a proposed budget of 630 000 €). This now goes to Parliament Plenary.

*Draft amendments ITRE/6385 BUDG n°152 and BUDG/4026*  
[http://www.europarl.europa.eu/meetdocs/2014\\_2019/plmrep/COMMITTEES/BUDG/DV/2018/09-24/budg2019-doc4-txt-4-EN.pdf](http://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/BUDG/DV/2018/09-24/budg2019-doc4-txt-4-EN.pdf) and adoption  
[http://www.europarl.europa.eu/meetdocs/2014\\_2019/plmrep/COMMITTEES/BUDG/DV/2018/09-24/AnnexPPPA\\_EN.pdf](http://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/BUDG/DV/2018/09-24/AnnexPPPA_EN.pdf)

*Modern Buildings Alliance news 10<sup>th</sup> July 2018 <http://www.modernbuildingalliance.eu/itre-committee-confirms-support-for-increased-fire-safety-in-europe/> and 25<sup>th</sup> September 2018 <http://www.modernbuildingalliance.eu/meps-take-another-step-toward-increased-fire-safety-in-europe/>*



## US firefighter cancer registry

In July 2018, US federal legislation (H.R.931) rendered obligatory the establishment and management by the US Centers for Disease Control and Prevention (CDC) of a public registry of firefighter cancer monitoring and data. The CDCs will collect voluntary data including on the number and types of fires attended by firefighters and will connect to State cancer registries. The law's stated objective is to improve monitoring of firefighter cancers and to publish epidemiological information.

*H.R.931 - Firefighter Cancer Registry Act of 2018 <https://www.congress.gov/bill/115th-congress/house-bill/931>*



## UK to ban flammable cladding on tall buildings

The UK Government has [announced](#) that it will ban “combustible” cladding on all new buildings >18 metres high and which contain residential accommodation, schools, care premises or student housing. The ban concerns all materials not achieving Euroclass A1 or A2 and follows a public [consultation](#). However, the UK Fire Brigades Union has [criticised](#) the announcement, underlining that it fails to address existing buildings and suggesting that only class A1 materials should be authorised. Recently, the BBC [published](#) tests results on Vitacore G2 cladding over mineral wool insulation, showing failure to BS-8414 whereas the current UK building regulations would “assume safety” for this design without testing, because all the components are fire safety rated as “limited combustibility”.

*UK Government press release, 1 October 2018*

<https://www.gov.uk/government/news/government-announces-new-housing-measures>

*“Grenfell Tower: New cladding ban ‘still allows flammable panels’, firefighters warn”, The Independent, 2 October 2018* <https://www.independent.co.uk/news/uk/home-news/grenfell-tower-cladding-firehigh-rise-building-flammable-panels-a8564136.html>

*“Replacement cladding fails fire safety test”, BBC 6<sup>th</sup> July 2018* <https://www.bbc.com/news/uk-44748514>



## EU initiatives on chemicals and recycling

The European Parliament plenary has adopted a resolution calling for actions on chemicals in recycling, in the interface between European chemicals, product and waste regulations. A public consultation by the European Commission is [open](#) on these questions until 29<sup>th</sup> October 2018. Parliament states that the primary objective should be to prevent hazardous substances entering the material cycle, particularly in imported articles, because these pose problems for recycling. Parliament calls to accelerate regulatory activities promoting the substitution of SVHCs (Substances of Very High Concern) and REACH restricted substances, so contributing to chemicals and product innovation. Parliament calls for actions towards better information on all substances of concern in products and wastes, addressing legacy substances in recycling, clarification of End-of-Waste and waste classification and tighter enforcement of waste legislation. European Council (Member States) also adopted a position in June 2018 supporting the Commission’s proposed “Strategy for Plastics in a Circular Economy” (16<sup>th</sup> January 2018, see pinfa Newsletter n°90) and calling on the Commission to identify substances of concern to be minimised or eliminated in products and waste (towards “non-toxic material cycles”), to facilitate material recycling in particular of polymers and to clarify the product / waste / recycling interface.

*European Parliament resolution on the Circular Economy Package and the interface between chemical, product and waste legislation, adopted 13<sup>th</sup> September 2018*

<http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P8-TA-2018-0353&language=EN&ring=B8-2018-0363>

*European Council conclusions on delivering on the EU Action Plan for the Circular Economy, adopted 25<sup>th</sup> June 2018* <https://www.consilium.europa.eu/en/meetings/env/2018/06/25/>

*EU public consultation open to 29<sup>th</sup> October 2018 “addressing the interface between chemical, product and waste legislation”* [https://ec.europa.eu/info/consultations/public-consultation-addressing-interface-between-chemical-product-and-waste-legislation\\_en](https://ec.europa.eu/info/consultations/public-consultation-addressing-interface-between-chemical-product-and-waste-legislation_en)

*Accompanying Impact Assessment, refs. refs. COM(2018) 441, SEC(2018) 294, SWD(2018)320* [https://ec.europa.eu/commission/sites/beta-political/files/budget-may2018-single-market-swd1\\_en.pdf](https://ec.europa.eu/commission/sites/beta-political/files/budget-may2018-single-market-swd1_en.pdf)



## ECHA list of chemicals used as flame retardants (FRs)

Last year, a number of companies were contacted by ECHA suggesting that they verify their REACH Registration dossier to confirm whether certain chemicals are used as flame retardants (uses specified in IUCLID and CSR), following an “access to documents” (ATD) request submitted to ECHA (not disclosed by whom). pinfa has obtained from ECHA the list of chemicals used as FRs resulting from this process, and this is available here (public information). ECHA have provided a list of 104 chemicals “identified as flame retardants in public sources” plus a further 44 chemicals for which the REACH Registration Dossier includes use as a FR (non-confidentially, for at least one registrant). pinfa notes that these lists include chemicals which are not FRs (ammonia – anhydrous, titanium dioxide, coal ashes, hydrogenated castor oil ...). We have suggested to ECHA to update the lists (following 2018 REACH Registrations and dossier updates) and have offered to support in improving their accuracy. **We welcome any comments on the lists provided to date by ECHA: chemicals listed which you consider are not FRs, but also FR chemicals which do not appear on either of the two ECHA lists.**

*ECHA – pinfa access to information request ATD/100/2018, ECHA reply 13-09-2018 available on request from [jcr@cefic.be](mailto:jcr@cefic.be)*



## EU project assessing new RoHS substance restrictions

The European Commission has engaged a project to assess seven possible additional substances to be considered for possible restrictions under the RoHS Directive (Restriction of Hazardous Substances in E&E electrical and electronic equipment). Of these seven, three are flame retardants or FR synergists: diantimony trioxide, tetrabromobisphenol A (TBBP-A) and medium chain chlorinated paraffins (MCCPs). The other four substances are indium, beryllium, nickel and cobalt compounds. The assessment is contracted to Oeko-Institute and Fraunhofer IZM who organised a stakeholder consultation (April –June 2018) and have [published](#) detailed documents on each of the seven substances (for comment). These documents summarise the current regulatory status and restrictions; toxicity and environmental concerns; uses, applications and quantities; and sources of information about substitution. pinfa has been contacted requesting further information concerning substitutes for these substances in E&E fire safety, applications and performance of PIN substitutes. **Any input to pinfa on these questions is welcome.**

*“Study to support the review of the list of restricted substances and to assess a new exemption request under RoHS 2”, Oeko-Institute and Fraunhofer IZM, documents for comment at <http://rohs.exemptions.oeko.info/index.php?id=289>*



## EU Ecodesign criteria for display screens

The European Commission is currently developing (unpublished) proposed “Ecodesign” criteria (under Directive 2009/125/EC on Ecodesign Requirements for Energy-Related Products) for electronic display screens (monitors). Proposed objectives for the criteria include eliminating substances classified as toxic, carcinogenic or dangerous for the environment and halogenated flame retardants. The draft EU document notes that brominated flame retardants pose a major issue for polymer recycling and that they should be prohibited in displays or in display stands. The proposed criteria further requests documentation of all plastic parts >50g

which contain flame retardants, specifying the polymer and the family of flame retardant. For these purposes, the document refers to standard ISO 1043-4 “Plastics – symbols and abbreviated terms – part 4: flame retardants”. This ISO Standard defines a flame retardant as follows: (3.1) “a substance that markedly retards the propagation of a flame”. It specifies 42 different families of flame retardants, e.g. three families for organic phosphorus FRs (non-halogenated, brominated, chlorinated), or fifteen families for inorganic flame retardants.

ISO 1043-4 “Plastics – symbols and abbreviated terms – part 4: flame retardants”  
<https://www.evs.ee/products/evs-en-iso-1043-4-2000>



Author: Ben Davis. Published on September 4, 2018

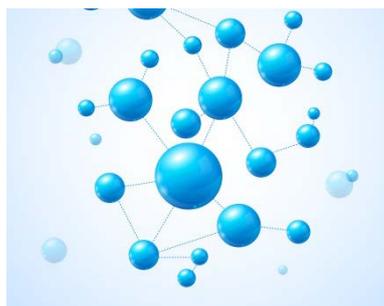
### Fire Loss in the United States During 2017

More than 1.3 million fires were reported by fire departments in 2017, resulting in an estimated 3,400 civilian deaths, nearly 15,000 civilian injuries, and \$23 billion in property loss

## Fire deaths in the USA not decreasing

The US NFPA (National Fire Protection Association) report on fire losses for 2017 shows that despite a continuing slow decrease in the number of fires (-2% from 2016) the number of civilian deaths at 3 400 /year increased slightly. Fires in the USA also caused nearly 15 000 civilian injuries (also increasing slightly from 2016) and US\$23 billion property loss in 2017. The fire property loss is more than twice that for 2016, largely because of wildfires, but non-wildfire structure fire property losses also increased by 35%. Nearly 80% of civilian fire deaths were in homes. Over the last 40 years, the number of home fire deaths fell from over 5 800 to around 2 600, but the death rate per fire has not significantly changed (7.4 deaths per 1 000 home fires in 2017). The report is based on a survey of nearly 2 600 fire departments across the USA and includes only fires attended by public fire services (property damage of non-attended fires is not included).

NFPA report “Fire Loss in the United States During 2017”, B. Evarts  
<https://www.nfpa.org/News-and-Research/Publications/NFPA-Journal/2018/September-October-2018/Features/2017-US-Fire-Loss-Report> and <https://www.nfpa.org/News-and-Research/Fire-statistics-and-reports/Fire-statistics/Fires-in-the-US/Overall-fire-problem/Fire-loss-in-the-United-States>



## ATH reduces heat and smoke from thermoplastic rubber

The inorganic PIN flame retardant aluminium trihydrate (ATH) was tested in EPDM (ethylene propylene diene monomer – 70%) – LDPE (low density polyethylene – 30%) composite. Such crosslinked thermoplastic elastomer combinations offer performance properties including process/design flexibility, strength, light weight and elasticity, and are increasingly used in a range of applications where fire safety is important, including artificial rubber, insulation, sealings and pipes, electrical and electronics, automobile and aircraft. Effects of six different loadings of ATH (from zero to 56%) in 2 mm EPDM-LDPE sheets were assessed on performance characteristics (rheometric, tensile, hardness, dynamic mechanical, electrical, thermogravimetric) and on fire performance (heat release, time to ignition, smoke release). ATH showed to reduce peak heat release (PHR) by nearly three, to increase time to ignition by nearly three and to reduce total smoke release to below 31% of smoke release from the composite without flame retardant.

“Effect of aluminum trihydrate as flame retardant on properties of a thermoplastic rubber nanocomposite”, M. A. Khattab et al., *Fire and Materials*, 2017; 41:688–699  
<http://dx.doi.org/10.1002/fam.2411>



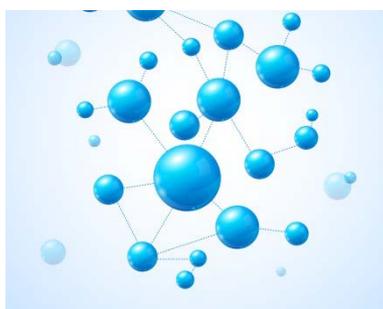
California

## California bans non-inorganic FRs in furniture

The State of California has enacted legislation banning, from 1<sup>st</sup> January 2020, all non-inorganic, halogenated or nano flame retardant or synergist chemicals in residential furniture, mattresses and children's products, placed on sale or in restoration. The ban specifies that it covers all chemicals which function to resist or inhibit fire, or as synergists to these, which are halogenated, contain carbon and phosphorus atoms, contain carbon and nitrogen atoms or are nanoscale. Consumer electronic products and products for use in public occupancies are not concerned.

*California Bill AB2998, approved 29<sup>th</sup> August 2018, "Consumer products: flame retardants"*  
[https://leginfo.ca.gov/faces/billTextClient.xhtml?bill\\_id=201720180AB2998](https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB2998)

*LEXOLOGY, 6<sup>th</sup> September 2018* <https://www.lexology.com/library/detail.aspx?q=97e416ca-bb6b-411e-bb7-6736d0ff1b23>



## PIN FR synergies in ABS

A research paper shows synergies between the organic and inorganic nitrogen-phosphorus PIN flame retardants in the performance polymer ABS (acrylonitrile butadiene styrene), using 15 % wt. Hntp (hexakis(4-nitrophenoxy) cyclotriphosphazene) and 15% APP (ammonium polyphosphate). Neat ABS did not pass UL94-V1, showed flaming dripping and LOI (limiting oxygen index) of 18. The PIN flame retardants enabled UL94-V0 (3.2 mm), no flaming dripping and LOI increased to over 25. Tensile strength tests indicated that this PIN FR loading was compatible with high temperature ABS applications. The authors conclude that the PIN FR fire performance was due to generation of cohesive and dense intumescent char on the polymer surface during fire.

*"High efficiency intumescent flame retardancy between Hexakis (4-nitrophenoxy) cyclotriphosphazene and ammonium polyphosphate on ABS", X. Cao et al., Polymer Degradation and Stability 143 (2017) 259-265*  
<http://dx.doi.org/10.1016/j.polymdegradstab.2017.07.022>

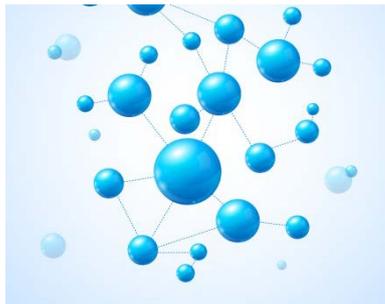
## MARKETPLACE

by chemsec

## ChemSec launches chemical substitution tool

International environmental NGO ChemSec has launched an online tool to facilitate substitution of hazardous chemicals, based on ChemSec's "SIN" List (Substitute It Now). ChemSec's SIN List has now been operational for ten years, aiming to provide a source of information on chemicals likely to be restricted in the future. The SIN List is often cited by reports into possible chemicals regulation, and is taken into account by e.g. the Dow Jones Sustainability Index (DJSI, see pinfa Newsletter n°81). The SIN List today includes over 900 chemicals, including a number of halogenated flame retardants as well as TPP (triphenyl phosphate). The new ChemSec "Marketplace", funded by the John Merck Fund with support from the Swedish Government, aims to list safer alternative chemicals to the SIN List substances, and to enable contacts between buyers and sellers of these safer chemicals. Several PIN flame retardant suppliers and pinfa members are placing information about their preferable and safer alternative flame retardant solutions onto the ChemSec "Marketplace".

See "ChemSec Safer Alternatives chemical digital forum" in pinfa Newsletter n°87.  
 ChemSec SIN list <https://chemsec.org/business-tool/sin-list/about-the-sin-list/>  
 "Substitute It Now... with this", ChemSec, 20<sup>th</sup> September 2018  
<https://marketplace.chemsec.org/articles/news/2018/09/20/substitute-it-now-with-this/>



## R&D: bio-based phosphorus FRs for polyurethanes

Six different phosphorus-containing polyols were synthesised from bio-based derivatives of castor oil, soybean oil, sucrose and orange peel, by reacting with DEAP (diethyl allylphosphonate, derived from triethyl phosphite) and 1-thio glycerol (TG). Rigid bio-based polyurethane foams were produced by reaction with isocyanate. The presence of phosphorus-containing polyols (1.5% wt. phosphorus) did not significantly modify foam characteristics (closed cell content, morphology) and enabled to achieve appropriate density, whilst reducing self-extinguishing time by over fifty times (reduced to <2 seconds for 12.5 mm thick sample after 10 seconds open flame) and mass loss in combustion by sixteen times (compared to foam with no phosphorus content). The improved fire performance was related to generation of a surface protecting char layer on the foam. The phosphorus content also showed to reduce total smoke emission (TSR) and smoke release rate (TSR reduced by nearly one half with 1.5% P wt.).

*"Sustainable flame-retardant polyurethanes using renewable resources", S. Bhoyate et al., Industrial Crops & Products 123 (2018) 480–488 <https://doi.org/10.1016/j.indcrop.2018.07.025>*



## Other News

**RDP indicated as possible ED and PBT:** Conclusions of the Risk Management Option Analysis (RMOA) carried out by the French authorities for ECHA on RDP (Tetraphenyl resorcinol bis(diphenylphosphate) = Tetraphenyl m-phenylene bis (phosphate), EC# 260-830-6) suggest that it may be an endocrine disruptor (ED) and persistent – bioaccumulative – toxic (PBT). Resorcinol, as a metabolite of RDP in the body, is indicated as probably without effects, but TPP (Triphenyl phosphate) generally present as an impurity in RDP may account for some of the observed effects. RDP was added to the ECHA CORAP list (Community Rolling Action Plan) in early 2018 - see pinfa Newsletter n°89

*ECHA website – CORAP – RMOA for RDP (March 2018) Risk Management Option Analysis <https://echa.europa.eu/pact/-/substance-rev/12936/term>*

## Publisher information:

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For abbreviations see: [www.pinfa.org](http://www.pinfa.org)