pinfa

Newsletter for non-halogen fire safety solutions

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Innovation

Consultation on furniture open-flame fire safety

The US National Fire Protection Association (NFPA), which develops many of the key safety codes for buildings and products applied by industry and regulators in the USA, has launched public consultation on the need for an open-flame fire safety test for upholstered furniture. NFPA estimates that upholstered furniture is responsible for a quarter of all home fire deaths (over 600 fatalities per year for the USA). NFPA figures show that open-flame ignition of furniture causes 31% of these deaths (either of the furniture directly by e.g. candles or matches, or by other burning items in case of fire). Foams in upholstered furniture can burn rapidly, if not flame retarded, leading to fast fire spread and high temperatures and smoke emission. Furniture is thought to have contributed significantly to the much shorter time before 'flashover' in home fires over past decades, endangering occupants and firefighters. NFPA therefore "feels strongly that a fully comprehensive fire safety regulation of upholstered furniture must address the full spectrum of major fire scenarios, including the open-flame scenarios".

Source: "Hot seat, a new look at the problem of furniture flammability", NFPA Journal Sept/Oct 2013
http://www.nfpa.org/newsandpublications/nfpa-journal/2013/september-october-2013/

1.3 million fires in 2012 in the USA

US fire services were called to 1 375 000 fires in 2012, of which over 480 000 involved a building structure. Nearly 80% of these structure fires were in homes. Fires killed 2 855 people and injured some 16 500 in the USA in 2012. The numbers of fires and of casualties has been falling since the late 1970's, when NFPA started collecting data, and 2012 shows the lowest number of deaths since then. NFPA underline however that the death rate in home fires has not declined: once a significant fire has started, it is just as likely to kill today as it was in the 1970's. Property loss from fires continued to increase, reaching US$ 12.4 billion in 2012, up 6.6% from 2011.

http://www.nfpa.org/research/statistical-reports/overall-fire-statistics/fire-loss-in-the-united-states

iNEMI alternatives materials assessment

iNEMI, the International Electronics Manufacturing Initiative, has launched a project to examine environmental and toxicology assessment tools and methodologies used for assessing alternative materials and chemicals, and to identify applicability to electronics industry manufacturing and products. The project will include benchmarking, using a selection of materials of interest and develop a gap analysis indicating the advantages and limitation of each assessment methodology. In a second phase, alternatives materials assessment tools identified will be applied to screen materials typically used in electronics manufacturing. The overall objective is to identify assessment tools which the electronics industry can agree as being the most appropriate for determining what constitutes a safer alternative to certain chemicals or materials currently used. Full project and work statements are online on the iNEMI website. Participation is open to organisations which are or become iNEMI members.

iNEMI "Alternative Materials Assessment - Environmentally Sustainable Electronics" http://www.inemi.org/project-page/alternative-materials-assessment

Plastic building materials and fire safety

SINTEF NBL has launched a project to assess the fire risks of plastic materials used in buildings, assessing the fire properties of different plastic materials, how they are used in buildings, and the specific fire risks related to certain applications. The risks of flammable materials in sandwich panels (enclosed in non-flammable materials) will be examined to better understand how these materials become involved in fire (fire spread in cavities, rupture of outer material during construction work). Fire risks related to increasing use of large volumes of plastics in agricultural buildings will be assessed (greenhouses, livestock production) This follows a 2012 pilot study looking at knowledge and attitudes of different actors and professionals: construction companies, materials suppliers, fire services, insurers, fire investigators, regulators. This concludes that many actors do not appreciate the differences in fire performance between different plastic materials and do not understand European information provisions about plastic materials' fire performance nor the regulations defining how different materials can be used.

"Plastic building materials and fire safety" in Brandposten n° 48 (2013) www.sp.se/en/units/fire/information/brandposten
2012 pilot project report (in Norwegian) http://nbl.sintef.no/publication/lists/docs/NBL A12138.pdf. or contact: Contact: NinaKristine.Reitan@sintef.no

Bus fire safety and escape time

The very rapid spread of fire following a minor collision between two natural-gas fuelled buses in Helsingborg in 2012 led to an investigation of fire spread and escape time from buses, commissioned from SP Sweden by the Swedish Accident Investigation Authority. Evacuation time and fire tests were carried out on real buses. Conditions become untenable after just over three minutes (carbon monoxide concentrations). The evacuation time with all doors available was one and a half minutes, meaning that the driver would have less than 2 minutes to detect the fire, open doors and start evacuating passengers, assuming that all doors opened correctly (in the Helsingborg incident, one set of doors did not open, but there were no casualties because the driver detected the fire and reacted rapidly). Location of fire detection equipment and fire barriers between engine and passenger compartments are identified as critical by SP. These tests show yet again the need to improve fire safety requirements for materials used in buses and coaches, in order to increase escape time.

"Can everyone safely escape from a burning CNG bus" in Brandposten n° 48 (2013)
www.sp.se/en/units/fire/information/brandposten

pinfa-NA presentation at SABIC flame retardant summit

pinfa North America presented an overview of PIN flame retardant developments at the SABIC flame retardant summit (24th September 2013). ***pinfa-NA*** members share the vision of an ideal flame retardant as non-migrating, non-toxic, releasing no additional toxic or corrosive gases in case of fire, recyclable in finished materials, degradable in the environment or remaining neutral as naturally occurring substances. PIN flame retardants are needed to respond to the increasing demand for fire safety in applications such as transport, electronics and construction where increasing use of polymers and flammable materials reflects moves towards high performance materials, greener materials and energy efficiency. ***pinfa-NA*** members work with downstream users to develop more effective PIN flame retardants for targeted applications, to continue to save lives from fire.

pinfa North America: http://www.pinfa-na.org/

Car manufacturer sales hit by fires

Shares of electrical car manufacturer TESLA fell over 6% after photos of one of its vehicles on fire were put online by bloggers. Firefighters are quoted as stating that the fire was initially caused by the car hitting an object on the road, but that the car's battery then caught fire, and that the fire got worse when water was used to try to extinguish it. After extinguishing the car using a dry chemical extinguisher, it was found that fires were continuing to burn in the battery pack

BBC 3rd October 2013: http://www.bbc.co.uk/news/business-24377350 and blog http://jalopnik.com/this-is-what-fiery-tesla-model-s-death-looks-like-1440143525

Phoenix EU project to develop new PIN FRs for electronics

The EU-funded project "Phoenix" aims to develop new fire resistant thermoset and thermoplastic materials for electrical and electronic equipment, low-voltage wires and cables and household appliances, based on PIN flame retardants combined with nano-application methods (e.g. nano-layered structures) and green polymers (e.g. modified lignins). The project will look at application of nano-technologies to PIN flame retardants, innovating processing routes to improve cost effectiveness, material performance, compounding and processing. The 4-year European Union 7th Framework project is coordinated by AIMPLAS, the Centre for Innovation and Technology in Valencia Spain.

Phoenix = Synergic combination of high performance flame retardant based on nano-layered hybrid particles as real alternative to halogen based flame retardant additives www.phoenix-eu-project.eu

Current trends in flame retardants for polymers

An article by Alexander Morgan, University of Dayton Research Institute, USA in "Plastic Trends" underlines the need to continue to develop flame retardants which ensure fire safety of polymers, which are an essential part of modern life but are inherently flammable, whilst taking into account environmental impact, life cycle and toxicity. He notes that many new commercial PIN flame retardants are being developed, and that research is ongoing. New flame retardants will be needed to address areas such as 3D printing, tighter fire safety requirements in cars and recycling plastics without risk of dangerous emissions. Types of new PIN FRs showing strong potential include commercial polymeric/oligomeric phosphonate and other phosphorus compounds, intumescent combinations and new boronic acid compounds. PIN flame retardants are also at the centre of new flame retardant application technologies, such as LbL (layer-by-layer) coatings for textiles and foams. A further article by the same author in "Fire & Materials" provides an overview of flame retardant technologies and their applications.

Alexander Morgan, Current Trends in Flame Retardants for Thermoplastics – Parts I, II and III (Feb – May 2013) http://www.plasticstrends.net/

"An overview of flame retardancy of polymeric materials: application, technology, and future directions", A. Morgan, J. Gilman, FAM Fire & Materials 37(4) 259-279, June 2013 http://onlinelibrary.wiley.com/doi/10.1002/fam.2128/abstract

PIN flame retardants lead expected world growth

A market report by Bcc Research predicts world flame retardant use to grow from 1.8 million tonnes in 2013 to 2.4 million tonnes in 2018. Market growth is predicted to be led by the inorganic FR aluminium trihydrate (ATH) at 28% growth from 2012 to 2018 and phosphorus based FRs at 56% growth over the period. The report notes the importance of concerns about chemical safety of flame retardants and consequent development of regulations limiting the use of specific flame retardants in certain applications. The benefits of protecting people from death and property from damage are taken into account as are the health and the environment profiles of flame retardants. The report also looks at new compounds and approaches addressing flame retardancy.

Bcc Research "Flame Retardant Chemicals: Technologies and Global Markets", September 2013: and summary fo conclusions http://www.reportlinker.com/p01622606-summary/Flame-Retardant-Chemicals-Technologies-and-Global-Markets.html

Calcium minerals as PIN flame retardants

The flame retardant effect of different forms of calcium hydroxide (lime) and calcium – magnesium hydroxide (dolomite) were tested in polyethylene (MDPE) and ethylene vinyl acetate (EVA). Fire performance showed to be similar to the widely used PIN flame retardant MDH (magnesium di hydroxide), but the hydrated calcium minerals released water vapour (inhibiting fire development) over a wider temperature range, enabling to broaden the temperature range of PIN FR systems. The magnesium compounds did not produce an effective char barrier on EVA, possibly because acetic acid released during polymer decomposition reacted with the magnesium hydroxide. The calcium minerals reacted with CO_2 in fire, generating calcium carbonate, which contributes to stability of char. The authors conclude that the calcium minerals offer promising PIN flame retardancy with both heat release reduction and the additional functionality of cohesive fire-resistant char barrier generation.

F. Laoutid et al., "Calcium-based hydrated minerals: promising halogen-free flame retardant and fire resistant additives for polyethylene and ethylene vinyl acetate copolymers", Degradation and Stability (Elsevier) 98 (2013) 1617-1635
http://www.sciencedirect.com/science/article/pii/S0141391013001912

Other news

France suspends the use of ammonium salts in cellulose fibre insulation materials, because certain of these salts can release ammonia, under certain conditions of humidity and temperature. The French Ministry specifies that the ammonium salts are used as flame retardants and are not toxic, the only risk being of irritation of respiratory tract and eyes by ammonia gas. The Ministry does not specify which ammonium substances pose problem and indicates that a study is underway to identify more stable products which do not release ammonia gas. Europe has authorised the French decree for a temporary 21 month period.

California to review building insulation fire standards. A law enacted in California in October requires the State Fire Marshall to review the State's flammability standards for building insulation materials, to verify whether these can only be met by the addition of chemical flame retardants and to propose revised regulations which ensure both (a) overall building safety and (b) adequate protection of building occupants and firefighters from fires which travel between walls and in enclosed spaces.

Firefighter exposure to brominated dioxins/furans (PBDD/Fs). For the first time, brominated PBDD/Fs have been measured in blood samples from a small sample of 12 firefighters in San Francisco. Levels of PBDD/Fs were considered susceptible to contribute substantially to dioxin-like toxicity in certain of the firefighters. Cogeners of PBDE (a brominated flame retardant) congeners were also detected. Previous studies have suggested that dioxin exposure in firefighters is not a health issue (Hölzer 1995, Hsu 2013)

US EPA Design for the Environment (DfE) report on alternatives to HBCD flame retardant in expanded polystyrene insulation. The draft assessment (Sept. 2013) identified only two currently viable and commercially available alternatives to HBCD in this application: a brominated co-polymer and brominated TBBPA derivative. The latter was rejected because of high potential for bioaccumulation. The brominated polymer was considered safer, but questions are posed regarding its persistence and degradation products in case of fire. No currently available PIN flame retardants were identified as being able to provide, on their own (blends were not considered), adequate flame retardancy and good compatibility with polystyrene.

Cefic REACH self-assessment tool. Cefic has developed a self-assessment tool to enable companies which manufacture, use or import chemicals to prepare for REACH inspection. This is one of numerous tools developed by Cefic for Europe's chemical industry. Available at: http://www.cefic.org/Industry-support/Implementing-reach/Guidances-and-Tools1/ select: "Enforcement" and "all"

French decree of 21st June 2013 temporarily suspending the use of ammonium salts cellulose fibre insulation materials: http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000027650722 and Ministry information page http://www.sante.gouv.fr/isolants-a-base-de-ouate-de-cellulose-adjuvantes-d-ammonium.html

California legislation Assembly Bill n° 127 (Health and Safety Code, fire safety) : http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB127

"Persistent organic pollutants including polychlorinated and polybrominated dibenzo- p-dioxins and dibenzofurans in firefighters from Northern California", S. Shaw et al., Chemosphere 91(2013) 1386-1394 http://www.sciencedirect.com/science/article/pii/S0045653513000313

"Dioxine, Furane und andere Organochlorverbindungen im Blut von Feuerwehrleuten – eine prospektive Querschnittstudie". Institut für Hygiene und Mikrobiologie der Ruhr-Universität Bochum, 1995 http://d-nb.info/946743231/about/html

Hsu, Guo, Wang, Liao, Liao, An occupational exposure assessment of polychlorinated dibenzo-p-dioxin and dibenzofurans in firefighters, Chemosphere 83(2011) 1353-1359 http://www.sciencedirect.com/science/article/pii/S0045653511002438

US EPA (Environmental Protection Agency) DfE (Design for the Environment) "Flame retardant alternatives for HBCD" project http://www.epa.gov/dfe/pubs/projects/hbcd/about.htm

Publisher information

This Newsletter is published for the interest of user industries, stakeholders and the public by *pinfa* (Phosphorus Inorganic and Nitrogen Flame Retardants Association), a sector group of Cefic (European Chemical Industry federation). The content is accurate to the best of our knowledge, but is provided for information only and constitutes neither a technical recommendation nor an official position of *pinfa*, Cefic or *pinfa* member companies.

Abbreviations

See pinfa website: http://www.pinfa.eu/library/glossary-of-abbreviations.html

Agenda

Events with active pinfa participation are marked: ►

12-13 Nov	Cologne, Germany	► Fire resistance in plastics (AMI) http://www.amiplastics-na.com/events/Event.aspx?code=C550
14-15 Nov	Paris	1st International Seminar for Fire Safety of Facades (CSTB). http://facade2013.sciencesconf.org/
19 – 21 Nov	Basel, Switzerland	Ecochem - Sustainable Chemistry & Engineering http://ecochemex.com/
20 – 21 Nov	Sydney, Australia	Fire Australia 2013 http://www.fpaa.com.au/events/fire-australia.aspx
28 November	Kuala Lumpur	Melamine Focus 2013 http://www.wiz-biz.com/news/html/?439.html
4-6 Dec	Jeju Island, Korea	► Ecodesign 2013, 8th International Symposium on Environmentally Conscious Design and Inverse Manufacturing http://www.ecodesign.or.kr/ecodesign2013/
10-14 Feb	Canterbury, New Zealand	11th International Symposium on Fire Safety Science http://www.iafss.org/symposium/11th-symposium/
2-3 April 2014	Seattle, USA	► Meeting High Performance Flammability Requirements for Aviation (contact *pinfa-na* Timothy.reilly@clariant.com)
14 – 17 April	Preston, UK	FRT14 – Fire Retardant Technologies 2014 (RSC Royal Society of Chemistry) http://www.rscspecialitychemicals.org.uk/future-conferences/fire-retardant-technologies-2014/
8 May	Dübendorf, Switzerland, Colorado	FlaMat 2014: The future of flame retardants - materials & systems (EMPA workshop in English): www.empa.ch/flamat_eng
13-14 May	Denver, Colorado	Fire Retardants in Plastics (AMI) http://www.amiplastics.com/events/event?Code=C583
18 – 19 May		BCC 25th Annual Conference: Recent Advances in Flame Retardancy of Polymeric Materials http://www.bccresearch.com/conference/flame
9 – 12 June	Las Vegas	US NFPA (National Fire Protection Association) Conference & Expo http://www.nfpa.org/training/nfpa-conference-and-expo
17 – 19 June	London	FIREX International Fire Prevention and Protection http://www.firex.co.uk/
22 – 24 June	Indianopolis	14th Annual Workshop on Brominated & Other Flame Retardants (BFR) http://www.bfr2014.indiana.edu/
1-2 Oct	Berlin, Germany	FIVE: 3rd International Conference on Fires in Vehicles Call for papers open to 1 Dec 2013 www.firesinvehicles.com
9 – 10 Oct	Basel, Switzerland	EuroFire 2013 www.eurofireconference.com
17 – 20 Nov	Vienna	Going Green – Care Innovation 2014 – Electronics and the Environment http://www.care-electronics.net/CI2014/