The Case against Candle Resistant Electronics

Summary Statement: International Electrotechnical Commission (IEC) Standard 62368, which will be voted on by April 25, 2008, would bring hundreds of millions of pounds[1] of potentially toxic fire retardant chemicals into consumers' homes each year, impede recycling of consumer electronics, and threaten human health and the global environment. There is no valid fire safety reason for this standard; the impetus comes from chemical industry's continued search for new market opportunities.

Requiring the outer housings of consumer electronics to resist candle ignition as put forth in Section 7 of IEC Standard 62368 is not necessary for fire safety.

Fire statistics from the National Fire Protection Association shows that candle fires in consumer electronics does not pose a level of risk that is considered a safety policy priority.[2] Current rigorous standards governing the safe functioning of electronic equipment are effective and sufficient; a new standard protecting electronics against candle fires is not warranted.

Fire retardant chemicals used to meet this standard could harm human health and the global environment.

Most currently used fire retardant chemicals lack adequate toxicological data to show they are safe for health.[3] The least expensive and most commonly used chemicals to meet the standard are brominated fire retardants (BFRs) and chlorinated fire retardants (CFRs). Many BFRs and CFRs have already been restricted due to their persistence, environmental mobility, and/or adverse effects on human health; others are being considered for restriction through RoHS and REACH in the EU. Most potential replacements, such as phosphates, lack adequate health and environmental data.[3] Fire retardant chemicals are being found in rapidly increasing levels in dust, the food chain, pet, wild animals, human fat, body fluids, and breast milk worldwide.[4] Many have been found to cause neurological impairments in brain development and reproductive abnormalities in sex organ development and sperm morphology, mutagenicity; carcinogenicity,[5] endocrine disrupting effects,[6] and other adverse health impacts in animal studies.

The addition of a variety of retarding chemicals into product housing makes responsible electronics recycling more difficult. Highly toxic dioxins and furans can form when FR treated plastics are burned.

The recycling industry is overcoming many challenges to become cost-effective. Increasing the fire retardant load in the plastic waste stream and introducing a mixture of fire retarding chemicals may make some types of recycling cost prohibitive or in certain cases impossible.[7] Adding a variety of fire retardants is likely to lead to more downcycling and burning to occur.
When burned, BFRs and CFRs produce highly toxic halogenated dioxins and furans.[8]

How can I keep these chemicals out of the electronics that I buy?

Electronics manufacturers need to know that their customers want to purchase electronics that do not contain hazardous fire retardant chemicals. They are being pressured by the chemical industry to include these chemicals even though the fire data do not show a benefit. The costs and adverse outcomes from this change would be so out of proportion to the problem even using the most conservative data, this major modification to product regulation is not justified.
Let retailers and electronics companies know you don't want unnecessary and potentially toxic chemicals in the electronic equipment you purchase.

[1] Approximately 1/3 of electronic housings are currently treated with fire retardant chemicals. The annual increase in fire retardant usage if Section 7 of the IEC standard were to be enacted is estimated to be twice the current usage. Estimates of this increase range from a low of 250,000 metric tons (550 million pounds) of BFRs to a high of 790,000 metric tons (1.7 billion pounds) in total.

[2]. - Hall, John R. 2002. Fires involving appliance housings – is there a clear and present danger? Fire Technology 38: 179-198.

- Ahrens, M. 2007. National Fire Protection Association Report on Home Candle Fires.

-Dave Wilson, October 1 2002, Electronic Equipment Ignition by Candle – Recent Incident Reports, Consumer Electronics Association

[3] Furniture Flame Retardancy Partnership: Environmental Profiles of Chemical Flame-Retardant Alternatives for Low-Density Polyurethane Foam, EPA 742-R-05-002A, September 2005

[4]Zota AR, Rudel RA, Morello-Frosch RA, Camann DE, Brody JG. 2007. Regional variation in levels of indoor polybrominated diphenyl ethers may reflect differences in fire safety regulations for consumer products. 17th Annual Conference of the International Society of Exposure Analysis, Research Triangle Park, NC.

-Arnold Schecter, Olaf Päpke, T. Robert Harris, K.C. Tung, Alice Musumba, James Olson, and Linda Birnbaum, Polybrominated Diphenyl Ether (PBDE) Levels in an Expanded Market Basket, Survey of U.S. Food and Estimated PBDE Dietary Intake by Age and Sex, Environmental Health Perspectives • Volume 114, Number 10(October 2006).

-Thomas A. McDonald, *Polybrominated Diphenylether Levels among United States Residents: Daily Intake and Risk of Harm to the Developing Brain and Reproductive Organs*, Integrated Environmental Assessment and Management, Volume 1, Number 4, pp. 343–354.

- Dye, J.A.; Venier, M.; Ward, C.R.; Zhu, L.Y.; Hites, R.A.; Birnbaum, L.S.; Pet cats in the U.S. have high polybrominated diphenyl ether (PBDE) serum levels. Environ. Sci. Technol. 2007, 41, 6350-6356.

[5]Linda S. Birnbaum and Elaine A. Cohen Hubal, Brominated flame-retardants: Cause for concern? Environmental Health Perspectives, Volume 112(2004).

-Viberg H, Johansson N, Fredriksson A, Eriksson J, Marsh G, Eriksson P., Neonatal exposure to higher brominated diphenyl ethers, hepta-, octa-, or nonabromodiphenyl ether, impairs spontaneous behavior and learning and memory functions of adult mice. Toxicol Sci. Volume 92, No. 1, pp.211-8. (2006).

-Zhou T, Taylor MM, Vito MJ, Crofton KM. Developmental exposure to brominated diphenyl ethers results in thyroid hormone disruption, Toxicol Sci. 2002 Mar;66(1):105-16.

- Stapleton HM, Brominated Flame Retardants: Summary of Scientific Studies on Accumulation and Debromination of DecaBDE, 11 December 2006, Health and environment Alliance, Brussels, Belgium.

[6]Hamers T, Kamstra JH, Sonneveld E, Murk AJ, Kester MH, Andersson PL, Legler J, Brouwer A. In vitro profiling of the endocrine-disrupting potency of brominated flame retardants. Toxicol Sci. 2006 Jul;92(1):157-73.

-Kitamura S, Suzuki T, Sanoh S, Kohta R, Jinno N, Sugihara K, Yoshihara S, Fujimoto N, Watanabe H, Ohta S. *Compar ative study of the endocrine-disrupting activity of bisphenol A and 19 related compounds.* Toxicol Sci. 2005 Apr;84(2):249-59. Epub 2005 Jan 5.

[-] Colborn, T Environ Health Perspect. 2004 Jun;112(9):944-9. Neurodevelopment and endocrine disruption.

[7] Dawson, Landry, "Recyclability of Flame Retardant HIPS, PC/ABS, and PPO/HIPS used in Electrical and Electronic Equipment." ISEE, 2005.

- Mark, F. The characteristics of plastics-rich waste streams from end-of-life electrical and electronic equipment. PlasticsEurope, 2006.

[8]Tange, L., Drohmann, D. "Waste electrical and electronic equipment plastics with brominated flame retardants – from legislation to separate treatment – thermal processes." Polymer Degradation & Stability 88 (2005), pp 35 – 40.

-Leung A, Cai ZW, Wong MH. 2006. Environmental contamination from electronic waste recycling at Guiyu, southeast China. Journal of Material Cycles and Waste Management 8(1): 21-33.

-LS Birnbaum, DF Staskal, JJ Diliberto , September 2003, Health effects of polybrominated dibenzo-p-dioxins (PBDDs) and dibenzofurans (PBDFs) - Environment International, Volume 29, Number 6, pp. 855-860(6).

For more information, please contact:

Arlene Blum, UC Berkeley, and Institute for Green Science Policy,
arlene@arleneblum.com 510 644-3164 http://greensciencepolicy.org/

Sara Schedler, Friends of the Earth,
SSchedler@foe.org 415.544.0790, ext. 17 (office) www.foe.org