



Kicking Toxic Chemicals Out Of The Office

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An Easy Guide To Going
Flame Retardant-Free



CEH

center for environmental health

Manufacturers Selling Flame Retardant-Free Office Furniture

CEH partnered with HDR Architecture, North America's second largest architecture firm, on a survey to identify office furniture suppliers that offer some or all of their products made without flame retardant chemicals.

Buyers should be aware that:

1. Some fabrics contain flame retardant chemicals, so it is important to specify only flame retardant-free fabrics.
2. It is challenging for some manufacturers to determine whether their plastic parts contain flame retardant chemicals, especially if recycled plastic is used. Manufacturers are beginning to explore this supply chain issue more deeply. To promote this investigation and ensure the accuracy of the providers claims, purchasers should request verification about the presence or absence of flame retardants in plastic parts.
3. This survey does not apply to upholstered office furniture products that needs to meet Technical Bulletin 133, a flammability standard for use in special occupancy spaces. TB 133 furniture typically contains flame retardant chemicals in one or more of the components.

Companies listed with an asterisk (*) are labeling their products sold nationwide for flame retardant content, not just for California as regulated by law.

The following companies have removed toxic flame retardants from ALL of their products:

Andreu World
andreuworldamerica.com

*Arcadia Contract
arcadiacontract.com

*DARRAN
darran.com

*David Edward Company
davidedward.com

Fresh Coast
freshcoastfurniture.com

*Global/GLOBALcare
usa.thinkglobalcare.com

Haworth
haworth.com

*Humanscale
humanscale.com

Leland International
lelandinternational.com

*Martin Bratrud
martinbratrud.com

*Neutral Posture
neutralposture.com

*SitOnIt Seating
sitonit.net

*Wieland (Healthcare)
wielandhealthcare.com

*9 to 5 Seating
9to5seating.com

The following companies have removed toxic flame retardant chemicals from SOME of their products. You'll want to ask them to point you to products that are flame retardant-free.

*American Seating Company
americanseating.com

*Herman Miller
hermanmiller.com

*K1
ki.com

*OFS Brands
ofsbrands.com

Steelcase
steelcase.com

*Teknion
teknion.com



So,

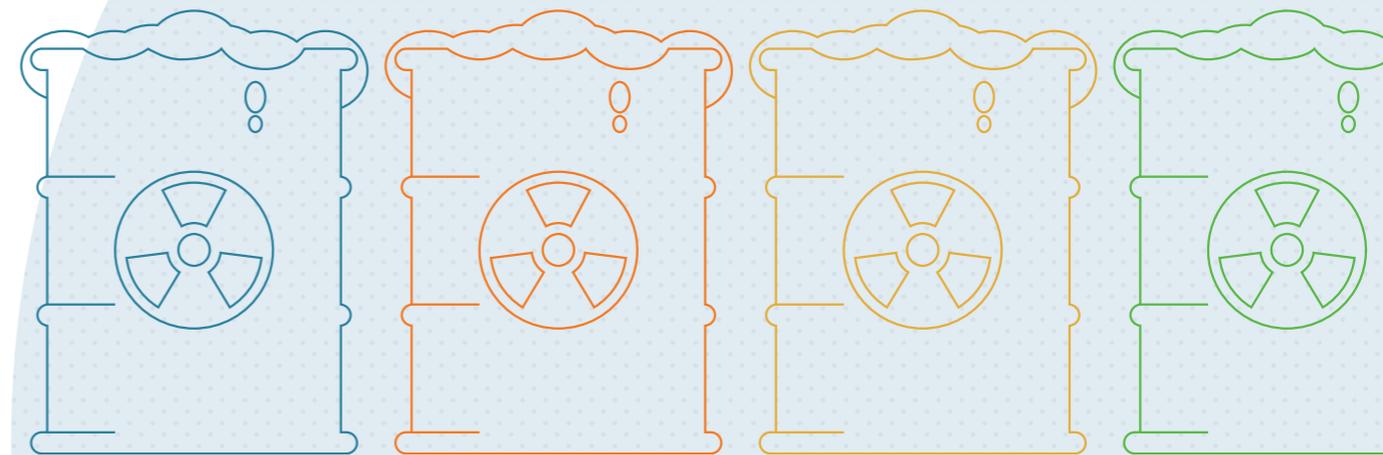


How Did Flame Retardant Chemicals Get Into Furniture In The First Place?

Oddly enough,
this story begins with big tobacco.

In the 1970's, the tobacco industry faced pressures from California regulators who were pressing them to make fire-safe (self-extinguishing) cigarettes in order to reduce the threat of house fires caused by smokers.¹ To avoid regulation, big tobacco joined with the makers of flame retardant chemicals to distort the science and convince government officials that we should douse our furniture with chemicals instead of making safer cigarettes. The gambit worked.²

California passed Technical Bulletin 117 (TB 117) - a de facto government mandated market for flame retardant chemicals used in furniture. Because California was such a big market, these rules were followed across the entire nation. The chemical companies made billions of dollars. Forty years later, disease-causing flame retardants are still widespread.



But Aren't Flame Retardants a Good Thing?

In recent tests, 85% of couches tested contained toxic or untested flame retardants.³ Flame retardants are chemical compounds added to a wide range of consumer products, including furniture, nap mats, baby products and dozens of other everyday items to delay the spread of fire. However, studies by the U.S. Consumer Product Safety Commission and others have concluded that flame retardants as used in furniture do not provide meaningful protection from fires.

We Ingest Them. They Make Us Sick.

These chemicals migrate out of products and into dust where you ingest or inhale them.⁴ Many flame retardants are linked with serious health problems including cancer, reduced IQ, developmental delays, obesity, and reproductive difficulties.⁵ Flame retardant chemicals have been found in 97% of all Americans tested⁶ and 100% of infants tested. That's right, it's in our blood, urine, breast milk and *even infant cord blood*.

Americans spend 90% of their time indoors.⁷ Therefore, the quality of their indoor environments is integral to their well-being.

- Flame Retardant production represents a \$5+ billion industry⁸
- Nearly all Americans have toxic flame retardant chemicals in their bodies⁹
- Flame retardants have a long history of health and environmental problems¹⁰
- There are dozens of toxic flame retardants currently in use¹¹
- Most flame retardants are untested¹²

Effects of Flame Retardants

-  REPRODUCTIVE HARM
-  CANCER
-  DEVELOPMENTAL DELAYS
-  OBESITY
-  REDUCED IQ



Flame Retardant Chemicals Don't Stop Fires in Furniture

While the chemical industry insists that flame retardant chemicals reduce the impact of fires, independent research tells a completely different story. The CPSC found that “fire retardant foams did not offer a practically significant greater level of open flame safety than did the untreated foams.”¹³

Today, most of the furniture on the market is covered with fabrics that resist smoldering cigarettes, which federal statistics show are the number one cause of furniture fires.

They Can Even Make Fires Less Survivable

When the furniture containing some flame retardant chemicals catches fire, it emits higher levels of carbon monoxide, soot, and smoke than untreated foam.¹⁴ The higher the concentration of these toxic gases, the faster it can cause unconsciousness and subsequent death. The largest cause of fire deaths is the inhalation of these toxic gases, not the fire itself.¹⁵

Flame retardant chemicals are also known to be major hazards to firefighters.¹⁶ More than half of all line-of-duty deaths in firefighting are now caused by cancer, and many firefighters believe that these chemicals are a significant cause.¹⁷

“Fire-retardant foams did not offer a practically significant greater level of open flame safety than did the untreated foams.”

Consumer Product
Safety Commission

“There are other ways that are more effective and avoid the potential risks of those (flame retardant) chemicals.”

Underwriters Laboratories
fire hazards research



A Welcome Change in the Regulations

As a result of recent efforts by the Center for Environmental Health (CEH) and many others, a new California law went into effect in January, 2014 (Technical Bulletin 117-2013) that changed the requirements such that manufacturers were no longer required to include flame retardants in their products.

The new standard Technical Bulletin 117-2013 addresses the *outside* cover fabric, the place where fires actually start, while the old standard focused on the *inner* foam. The new standard can be met through the use of smolder resistant fabrics. A small percentage of fabrics may contain flame retardant chemicals, so be sure the fabric you select is flame retardant-free.

More good news! As of 1/1/15 purchasers may be able to identify flame retardant-free furniture through a label located under the product or under a cushion (see sidebar). CEH co-sponsored a California bill that required furniture manufacturers selling into the state of California to clearly label their products as to whether they do or do not contain flame retardant chemicals. While this is a California requirement, 75% of the office furniture manufacturers who responded to our survey are labeling their products in this manner nationwide. Note: The product label does not currently require disclosure of any flame retardants that may be included in plastic parts. In order to obtain fully flame retardant-free products, we recommend that you use our furniture survey and technical specifications which do require disclosure of flame retardants in plastic parts.

How To Reduce Your Risk At The Office



1. Minimize Contact with Dust

Wash your hands often, especially before eating. If possible, open your window frequently for good ventilation. Wipe down your desk and other surfaces regularly with a wet sponge or towel. Request regular vacuuming of your office ideally with a HEPA (High-efficiency particulate arrestance) filter.



2. Buy Flame Retardant-Free Products

The single best way to protect yourself and your employees from harmful flame retardant chemicals is not to let them into your office in the first place. Many forward-thinking companies like Kaiser Permanente, Autodesk, Facebook, Yahoo!, HDR, and Genentech have committed to doing just that by signing the CEH Purchaser's Pledge. The pledge signers collectively spend more than \$520 million annually on furniture. When major companies make demands like this from their suppliers, the entire marketplace shifts to safer products without flame retardant chemicals. We invite your company to [join them](#).

NOTICE
THIS ARTICLE MEETS THE FLAMMABILITY REQUIREMENTS OF CALIFORNIA BUREAU OF ELECTRONIC AND APPLIANCE REPAIR, HOME FURNISHINGS AND THERMAL INSULATION TECHNICAL BULLETIN 117-2013. CARE SHOULD BE EXERCISED NEAR OPEN FLAME OR WITH BURNING CIGARETTES.

The upholstery materials in this product:
 contain added flame retardant chemicals
 contain NO added flame retardant chemicals

The State of California has updated the flammability standard and determined the fire safety requirements for this product can be met without adding flame retardant chemicals. The State has identified many flame retardant chemicals as being known to, or strongly suspected of, adversely impacting human health or development.



Making The Business Case



1. Flame Retardant-Free Furniture Is Cost Neutral Or May Even Be Less Expensive And Provides Adequate Fire Safety

Furniture free of flame retardant chemicals is the same price as furniture containing these harmful chemicals. In some cases it's cheaper. For many buildings such as hospitals, prisons, and auditoriums that are equipped with fire sprinklers, the new law allows these companies to meet safety regulations without the use of flame retardant chemicals in most jurisdictions. This can save you approximately \$30-\$100 per chair and \$200-\$300 per sofa - dollars that can be re-directed to other strategic priorities.



2. Flame Retardant Chemicals Are Associated With Serious Health Effects

Flame retardant chemicals migrate out of furniture into the indoor environment and find their way into human bodies through hand to mouth contact and inhalation. Many flame retardants have been associated with a variety of serious health effects, including decreased fertility, hormone disruption, reduced IQ, diabetes, obesity, and cancer.



3. Flame Retardants Offer No Measurable Fire Safety Benefits

Studies have shown that not only do the flame retardant chemicals in furniture foam fail to delay or reduce the severity of fires, they can also make those fires less survivable due to the increased toxic gases emitted when the flame retarded furniture burns.

“ Where there is credible evidence that a material might result in harm to the environment or public health, we work to replace it with safer alternatives. Flame retardant chemicals are the perfect example of toxicants we just don't need.”

Kathy Gerwig, Vice President of Employee Safety, Health and Wellness, and Kaiser Permanente's Environmental Stewardship Officer





4. Flame Retardant-Free Furniture Is More Durable And Comfortable

Furniture and foam manufacturers have indicated that furniture without flame retardants is more durable, and may have a more comfortable “sit” than flame-retarded furniture. Industry experts report that flame retardants degrade the foam more quickly and make the foam harder.



5. It's Consistent With Your Company's Mission

Going flame retardant-free may be consistent with your company's commitment to safety, health or sustainability.



6. It's A Clear HR Win

Going flame retardant-free is a tangible demonstration that the company cares about the health and well-being of its employees.



7. The Company Would Be In Good Company

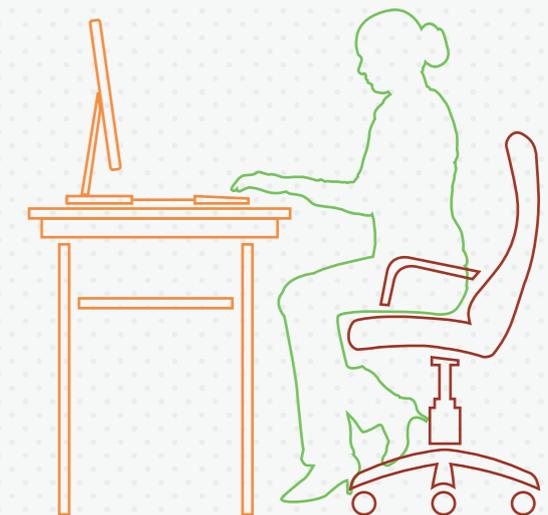
Going flame retardant-free demonstrates leadership in the area of health and sustainability and puts you in the same league of forward thinking companies as Facebook, Genentech, Kaiser Permanente, Yahoo!, Dignity Health and many others who have made the same pledge.



8. The Only Question Left: Why Wouldn't Your Company Do It?

Top 7 Reasons to Buy Flame Retardant-Free Office Furniture

1. Flame retardants are harmful and unnecessary
2. May save money
3. More durable and comfortable places to sit
4. Improved employee health and well being
5. Demonstrates leadership in the area of sustainability
6. Shows employees you care about their health
7. Reduced toxics in the work environment



A Tale of Two Standards



Furniture is typically made to meet one of two flammability standards:

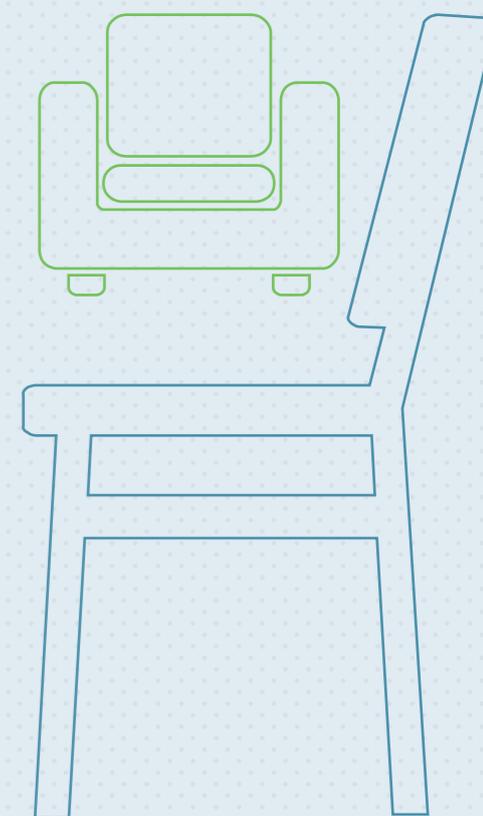
TB 117-2013 is the standard that is used for most office furniture. TB 117-2013 can be met without the use of flame retardant chemicals, although the standard does not prohibit their use. Refer to our purchasing guide on page 2 for a list of manufacturers producing flame retardant-free furniture. This list will be regularly updated on our website www.ceh.org/office-furniture. You can use the technical specifications on pages 11 and 12 to specify flame retardant-free furniture when you are issuing Requests for Proposals or Invitations to Bid.

TB 133 is a flammability standard designed for “special occupancy” buildings. Furniture that meets TB 133 is typically made with flame retardants in the foam, fabric and/or barrier material and is significantly more expensive than TB 117-2013 furniture. States vary in their definition of what they consider to be a “special occupancy building”, but the term usually includes health care settings and prisons. Auditoriums, public assembly areas of hotels and motels, dormitories and childcare centers may also be considered “special occupancy buildings.” Check with your local and state fire marshal to learn what is covered by this definition in your state.

Allowed exemptions to TB 133:

In almost all jurisdictions, special occupancy buildings that are fully fire sprinklered are allowed to meet TB 117-2013. The ability to comply with TB 117-2013 instead of TB 133 is a financial and environmental win for your business. Please note: The City of Boston is an exception to this rule and does not allow certain public buildings to meet TB 117-2013 even if the building is fully fire sprinklered. The Boston code is being reviewed and it is possible that in the future, this will change.

If you must buy furniture that meets TB 133 you can specify furniture that does not contain “halogenated” flame retardant chemicals. Many halogenated flame retardants have been found to be persistent, bioaccumulative and toxic. You can use the sample technical specifications for Technical Bulletin 133/ASTM E1537 to specify “non-halogenated” flame retardants when you are issuing Requests for Proposals or Invitations to Bid.



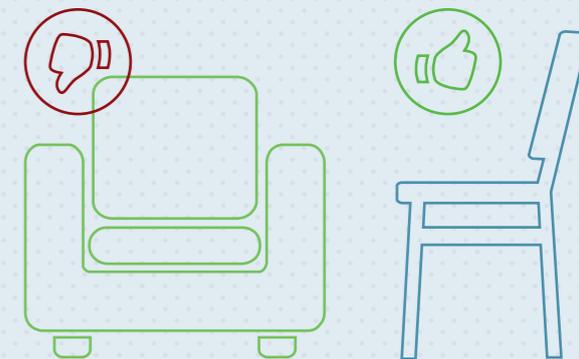
Making It Easy For Purchasing



When making a change in the way that your company buys things, you will want to help make this change as easy as possible for your purchasing department.

CEH has developed the following resources to help purchasers become aware of the issue and to execute the needed changes:

1. **Letter to Suppliers** expressing your preference for flame retardant free furniture <http://www.ceh.org/wp-content/uploads/Letter-to-vendors-2015-Final.pdf>
2. **Purchaser Pledge** to Prefer Flame Retardant Free Products <http://www.ceh.org/wp-content/uploads/FR-Pledge.pdf>
3. **Technical Specifications** to be used in Requests for Proposals or Invitations to Bid (see pages 11 and 12) *Developed in collaboration with Health Care Without Harm, Oregon Environmental Council and Clean Water Action - Connecticut*
4. **Furniture Survey** to gain information about suppliers' use of flame retardants in their products <http://www.ceh.org/wp-content/uploads/Office-furniture-survey.pdf>
5. **Fact Sheet** <http://www.ceh.org/wp-content/uploads/FR-Safer-Furniture-Fact-Sheet.pdf>
6. **Top Reasons to Go Flame Retardant-Free** <http://www.ceh.org/wp-content/uploads/Top-Reasons.pdf>
7. **Webinar, "Kicking Toxic Chemicals Out of Your Office Furniture"**: Contact Judy Levin at judy@ceh.org to schedule or join a webinar



Technical Specifications for TB 117-2013 or NFPA 260 or 261 Furniture

(Most common standard for office buildings and other special occupancy buildings that have automatic fire sprinklers)

Product Scope

Upholstered Furniture Seating Products that must comply with TB 117-2013/ NFPA 260/261.

Technical Specifications

(For Invitations to Bid and Requests for Proposals)

All seating supplied under the resulting Price Agreement shall be free of added flame retardant chemicals^{i,iv}; this applies to both standard and optional seating componentsⁱⁱⁱ, excluding electrical components. Electrical components shall be free of halogenated flame retardantsⁱⁱ. Verification of compliance shall be provided to **[requesting organization]** prior to contract award.

Evaluative Criteria

(For Requests and Proposals)

1. Describe how each of the proposed product lines, including optional seating components, meets the applicable flammability standard. Include details on the specific materials and strategies used in lieu of flame retardant chemicals.

Guidance to Reviewer:

This question is intended to give respondents the opportunity to describe how they avoid using flame retardant chemicals in their products while still meeting flammability standards. Responses that describe how chemical flame retardants are avoided are preferable to simply stating that the product is chemical flame retardant-free but failing to provide details. It is expected that most manufacturers will meet the standard without the use of flame retardant chemicals by using a smolder proof, densely woven, or inherently flame resistant fabric. Some manufacturers may use an additional fiber batting to meet the flammability standard, especially if they are using smolder prone fabrics. The above techniques should be sufficient to meet the standard without the use of flame retardant chemicals.

2. Does your company verify that the products are free of added flame retardant chemicals? Yes No

If yes, describe your verification process:

Guidance to Reviewer:

This question is intended to clarify the rigor of the vendor's responses to this question. The actions under "Acceptable" should be the minimal response for any manufacturer and those labeled "Better" and "Best" should be preferred.

Acceptable:

Written verification from the manufacturer's suppliers of foam, fabric, barrier materials, and decking materials is required under California law SB 1019. While it is mandatory only for products sold in California, most manufacturers are complying with the law nationwide and documentation should be available for all products. Purchasers can ask to see the written verification statements from their suppliers.

Better:

Written verification from suppliers (as described above) with additional laboratory testing for at least some flame retardant chemicals (testing for halogenated flame retardants is feasible via XRF analysis). Additional testing for the presence of phosphorous and/or nitrogen based flame retardants is preferred.

Best:

Written verification from suppliers and lab testing by suppliers (as described above) **plus** the manufacturer conducts random laboratory testing of the various components with a frequency of no less than once per year to verify the suppliers' laboratory results.

NOTE: In the coming year we hope there will be a third party certification program for claims of "flame retardant-free." At that time, 3rd party certification would be the best option.

3. Submit any available Health Product Declarations (HPD) for the proposed product lines.

Guidance to Reviewer:

Providing HPDs is preferable to not providing HPDs. Multiple HPDs may be submitted for a product system or assembly, like furniture.

If respondents submit HPDs, they may include varying degrees and types of disclosure. The level and nature of disclosure included in a HPD can provide additional insight into how to evaluate responses. Higher levels of ingredient disclosure (i.e., greater percentage of ingredients listed, associated hazards listed) are preferable to lower levels. For the type of disclosure, third party disclosure is preferable to second or first (self-declared) types of disclosure.

More information on HPDs is available at: <http://hpdcollaborative.org/>



Technical Specifications for TB 133 or ASTM E 1537 Furniture

(Common standard for special occupancy buildings without fire sprinklers)

Product Scope

Upholstered Furniture Seating Products that must comply with TB 133/ ASTM E 1537.

Technical Specifications

(For Invitations to Bid and Requests for Proposals)

All seating supplied under the resulting Price Agreement shall be free of added halogenated flame retardant chemicals^{i,ii}; this applies to both standard and optional seating componentsⁱⁱⁱ. The manufacturer shall identify which components of the furniture contain added flame retardant chemicals^{iv} and which added flame retardant chemicals are used. Verification of compliance shall be provided to **[requesting organization]** prior to contract award.

Evaluative Criteria

(For Requests and Proposals)

1. Describe how each of the proposed product lines, including optional seating components, meets the applicable flammability standard.

Guidance to Reviewer:

This question is intended to give respondents the opportunity to describe how they avoid using halogenated flame retardant chemicals in their products and what chemicals or materials are used to meet the flammability standard. Responses that provide details as to what chemicals and materials are used to meet the flammability standard, by component type, are preferable to answers that make simple statements without details or fail to answer the question. Responses that confirm that the products are free of halogenated flame retardant chemicals are preferable to responses that do not provide such confirmation.

2. Does your company verify that the products are free of halogenated flame retardant chemicals? Yes No

If yes, describe your verification process:

Guidance to Reviewer:

This question is intended to clarify the rigor of the vendor's responses to this question. The actions under "Acceptable" should be the minimal response for any manufacturer and those labeled "Better" and "Best" should be preferred.

Acceptable:

Written verification from the manufacturer's suppliers of foam, fabric, barrier materials, and decking materials confirming that the components are halogenated flame retardant-free. Purchasers can request written verification statements from their suppliers.

Better:

Written verification from suppliers (as described above) with additional laboratory testing for halogenated flame retardants.

Best:

Written verification from suppliers and lab testing by suppliers (as described above) **plus** the manufacturer conducts random laboratory testing of the various components with a frequency of no less than once per year to verify the suppliers' laboratory results.

3. Submit any available Health Product Declarations (HPD) for the proposed product lines.

Guidance to Reviewer:

Providing HPDs is preferable to not providing HPDs. Multiple HPDs may be submitted for a product system or assembly, like furniture.

If respondents submit HPDs, they may include varying degrees and types of disclosure. The level and nature of disclosure included in a HPD can provide additional insight into how to evaluate responses. Higher levels of ingredient disclosure (i.e., greater percentage of ingredients listed, associated hazards listed) are preferable to lower levels. For the type of disclosure, third-party disclosure is preferable to second or first (self-declared) types of disclosure.

More information on HPDs is available at: <http://hpdcollaborative.org/>

Definitions can be found on page 13



Definitions

- i. **“Added flame retardant chemicals”** means flame retardant chemicals that are present at levels above 1,000 parts per million.
- ii. **“Halogenated flame retardant chemical”** (also known as organohalogen flame retardant) means any chemical or chemical compound containing chlorine or bromine bonded to carbon for which a functional use is to resist or inhibit the spread of fire. This includes any chemical or chemical compound containing chlorine or bromine bonded to carbon for which “flame retardant” appears on the substance Safety Data Sheet (SDS) pursuant to Section 1910.1200(g) of Title 29 of the Code of Federal Regulations.
- iii. **“Component”** means the separate constituent parts of upholstered furniture, including, but not limited to, cover fabrics, barrier materials, resilient filling materials, decking materials, and plastic parts.
- iv. **“Flame retardant chemical”** means any chemical or chemical compound for which a functional use is to resist or inhibit the spread of fire. Flame retardant chemicals include, but are not limited to, halogenated, phosphorous-based, nitrogen-based, and nanoscale flame retardants, and any chemical or chemical compound for which “flame retardant” appears on the substance Safety Data Sheet (SDS) pursuant to Section 1910.1200(g) of Title 29 of the Code of Federal Regulations.



Six Other Things You Can Do

Our continued and prolonged exposure to toxic chemicals such as flame retardants is harming our health and the health of our children. Our government isn't protecting us. So it's up to all of us to change the system using our voices, votes, community, and dollars.



1. Contact Us For Help

Contact CEH for assistance in implementing or promoting this topic in your organization. We have helped many organizations with this process and have a number of tools to help expedite the transition. Contact Judy@ceh.org for more information.



2. Sign The CEH Pledge

Join other forward thinking companies like Facebook, Genentech, Dignity Health, Kaiser Permanente, Autodesk, and Yahoo and sign the [CEH Purchaser Pledge](#) promising to prefer flame retardant-free in the workplace.



3. Tell The Federal Government Don't Reopen the Door to the use of FRs

The federal Consumer Product Safety Commission (CPSC) is considering a standard that would undo California's rule and promote the use of harmful flame retardants in furniture. Sign [the petition](#) and let them know you disapprove.



4. Apply Political Pressure

Protect your employees and community by supporting The Children and Firefighter Protection Act (S. 2811) sponsored by Senator Chuck Schumer (NY). This federal bill bans the ten worst toxic flame retardants from use in upholstered furniture and children's products, and allows the CPSC to ban similar chemicals shown to be hazardous. [Urge your U.S. senator to protect our families' health by cosponsoring The Children's and Firefighters Protection Act \(S. 2811\).](#)



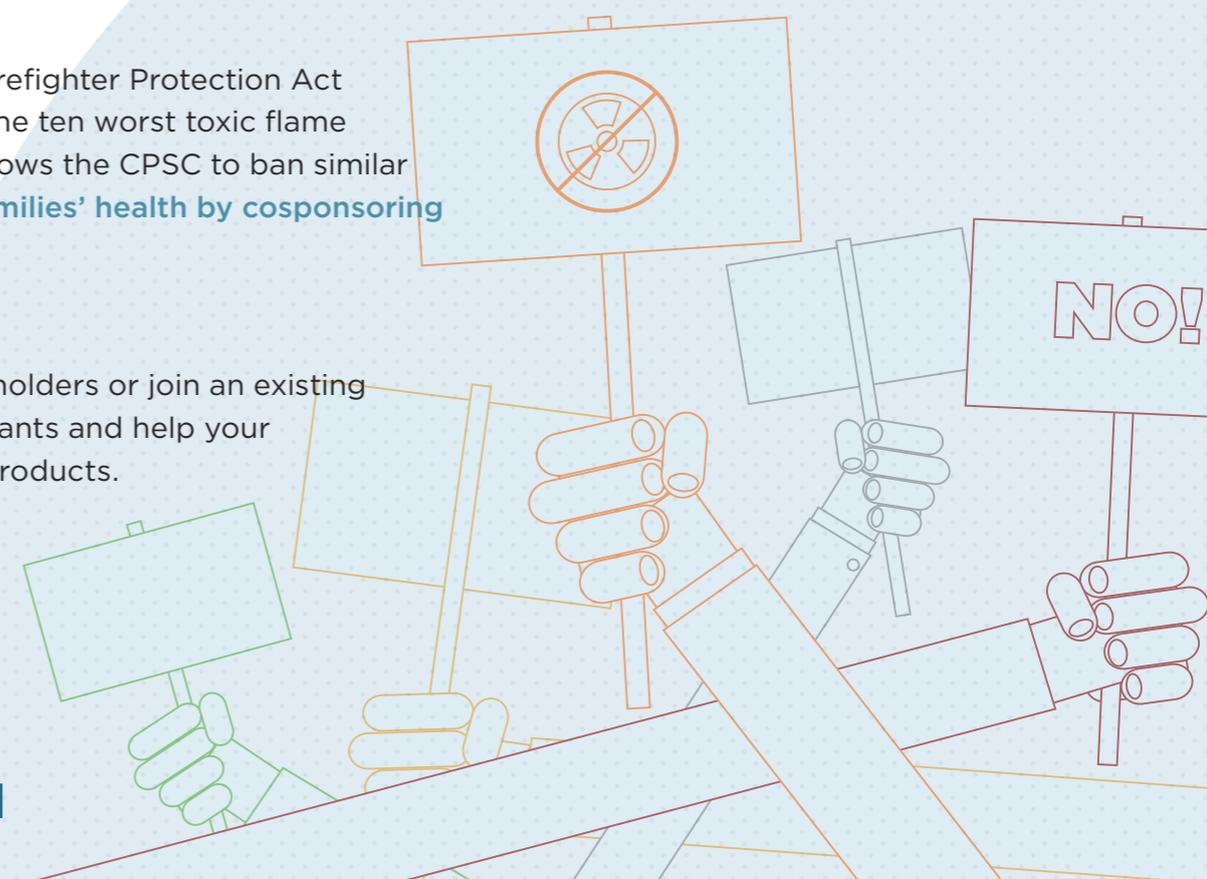
5. Request a Free Webinar

Email judy@ceh.org to arrange for a free webinar with your company stakeholders or join an existing webinar. In the webinar we will cover the issues and dangers of flame retardants and help your organization navigate the marketplace towards flame retardant free office products.



6. Spread The Word

Forward this guide to your colleagues, partners, vendors and friends.



Sources

- ¹ Environmental Sociology, “A multisector alliance approach to environmental social movements: flame retardants and chemical reform in the United States,” Cordner et al, <http://www.tandfonline.com/doi/pdf/10.1080/23251042.2015.1016685>, 2015 Vol. 1, No. 1, 69–79 (pg 74)
- ² Environmental Sociology, “A multisector alliance approach to environmental social movements: flame retardants and chemical reform in the United States,” Cordner et al, <http://www.tandfonline.com/doi/pdf/10.1080/23251042.2015.1016685>, 2015 Vol. 1, No. 1, 69–79 (pg 74)
- ³ “Novel and High Volume Use Flame Retardants in US Couches Reflective of the 2005 PentaBDE Phase Out. Stapleton, H. et al.” Environ. Sci. Technol., 2012, 46 (24), pp 13432–13439, <http://pubs.acs.org/doi/abs/10.1021/es303471d>
- ⁴ “An assessment of sources and pathways of human exposure to polybrominated diphenyl ethers.” Johnson-Restrepo, B. and Kurunthachalam Kannan. Chemosphere, 2009, vol. 76, Issue 4, pp 542–548, <http://www.sciencedirect.com/science/article/pii/S004565350900294X>
- ⁵ Reviews on Environmental Health, “Halogenated flame retardants: do the fire safety benefits justify the risks?” Shaw et al, Volume 25, No. 4, 2010, <http://greensciencepolicy.org/wp-content/uploads/2013/12/25-HFRs-benefit-v-risk-Review-of-Env-Health-2010-SHAW-BLUM-et-al.pdf>
- ⁶ “PBDE concentrations in women’s serum and fecundability.” Harley et al. Environmental Health Perspectives, Vol 118, Number 5, May 2010, <http://ehp.niehs.nih.gov/wp-content/uploads/118/5/ehp.0901450.pdf>
- ⁷ “Buildings and their Impact on the Environment: A Statistical Summary”. Revised April 22, 2009, <http://www.epa.gov/greenbuilding/pubs/gbstats.pdf>
- ⁸ Ceresana Research Institute, “Flame retardants market to reach \$6 billion by 2018,” Trade Publication, August 2011, <http://connection.ebscohost.com/c/articles/64443779/flam-retardants-market-reach-nearly-6-billion-by-2018>
- ⁹ “PBDE concentrations in women’s serum and fecundability” Harley et al, Environmental Health Perspectives. Vol 118, Number 5, May 2010. <http://ehp.niehs.nih.gov/wp-content/uploads/118/5/ehp.0901450.pdf>
- ¹⁰ Reviews on Environmental Health, “Halogenated flame retardants: do the fire safety benefits justify the risks?” Shaw et al, <http://greensciencepolicy.org/wp-content/uploads/2013/12/25-HFRs-benefit-v-risk-Review-of-Env-Health-2010-SHAW-BLUM-et-al.pdf>, Volume 25, No. 4, 2010
- ¹¹ The Silent Spring Institute: <http://www.silentspring.org/resource/fact-sheet-house-dust-contains-carcinogens-and-untested-chemicals-used-flame-retardants> and Dodson, R. et al. “After the PBDE Phase-Out: A Broad Suite of Flame Retardants in Repeat House Dust Samples from California” Environ. Sci. Technol., 2012, 46 (24), pp 13056–13066
- ¹² The Silent Spring Institute: <http://www.silentspring.org/resource/fact-sheet-house-dust-contains-carcinogens-and-untested-chemicals-used-flame-retardants> and Dodson, R. et al. “After the PBDE Phase-Out: A Broad Suite of Flame Retardants in Repeat House Dust Samples from California” Environ. Sci. Technol., 2012, 46 (24), pp 13056–13066
- ¹³ Mehta, S. Upholstered Furniture Full Scale Chair Tests – Open Flame Ignition Results and Analysis. <https://www.cpsc.gov/PageFiles/93436/openflame.pdf> [Memorandum, 5/9/12]. Bethesda, MD: United States Consumer Product Safety Commission
- ¹⁴ “Fire-Retardant Characteristics of Water-Blown Molded Flexible Polyurethane Foam Materials.” Jayakody, Chandrasiri et al. J. Fire Sciences, Vol. 18, pp 430–455, 2000 <http://jfs.sagepub.com/content/18/6/430.abstract>
- ¹⁵ “Toxic smoke inhalation: Cyanide poisoning in fire victims,” Jones et al, American Journal of Emergency Medicine, Vol 5, Number 4, 1987, [http://www.ajemjournal.com/article/0735-6757\(87\)90360-3/abstract](http://www.ajemjournal.com/article/0735-6757(87)90360-3/abstract)
- ¹⁶ “Persistent organic pollutants including polychlorinated and polybrominated dibenzo-p-dioxins and dibenzofurans in firefighters from Northern California” Chemosphere, 91, 138601394, 2013 <http://www.ncbi.nlm.nih.gov/pubmed/23395527>
- ¹⁷ “When Flame Retardants Burn: Exposure to Combustion By-Products and Cancer Risk Among Firefighters.” Shaw et al., Organohalogen Compounds (in press)



Additional Resources

1. CEH website: <http://www.ceh.org/campaigns/flame-retardants>
2. Chicago Tribune, Playing with Fire 6 part series: <http://media.apps.chicagotribune.com/flames/index.html>
3. Kaiser Permanente No Longer Purchasing Furniture with Flame Retardant Chemicals: <http://share.kaiserpermanente.org/article/kaiser-permanente-commits-to-purchasing-furniture-free-from-toxic-flame-retardant-chemicals>
4. Flame Retardants in Furniture Foam: Benefits and Risks: Babrauskas, Blum Daley and Birnbaum: <http://bit.ly/1wCW7me>
5. Toxic Hot Seat: <http://www.toxichotseatmovie.com>
6. Flame retardants in consumer products are linked to health and cognitive problems By Liza Gross, Washington Post: <http://wapo.st/17hebcr>
7. A Public Interest Guide to Toxic Flame Retardant Chemicals: http://ipen.org/pdfs/ipen_flame_retardants_2012_06.pdf
8. New York Times, "A Flame Retardant That Came With Its Own Threat To Health", May 3, 2015, http://www.nytimes.com/2015/05/04/us/a-flame-retardant-that-came-with-its-own-threat-to-health.html?_r=0





About The Center For Environmental Health

Founded in 1996, CEH is a national non-profit organization of people dedicated to eliminating the dangers of toxic and disease-causing chemicals in our everyday environment. Learn more at ceh.org.



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