

# Environmentally-Preferable Approaches for Meeting Furniture Fire Safety Standards

## Project Scope Summary Draft for Comment

Pentabromodiphenylether (PentaBDE) has been the primary flame retardant used in low-density flexible polyurethane foam. Approximately 95% of the pentaBDE consumed worldwide is used in the United States. Great Lakes Chemical Corp., the only U.S. manufacturer of pentaBDE, recently announced a voluntary phase out of both pentaBDE and octaBDE by the end of 2004. The leading user of this foam is the furniture manufacturing industry, which because of the voluntary phase-out, will need to move to alternative chemical flame retardants and other methods to meet fire safety standards over the next year. As alternatives become available, it is important that we fully understand their potential health and environmental impact, cost, and how well the alternatives perform.

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The furniture manufacturing industry and EPA's Design for the Environment (DfE) Program are initiating a partnership to explore a variety of approaches to achieve environmentally sound fire protection. Approaches may include:

- Green Chemistry Solutions: Environmentally conscious design of chemical products and processes
  - Identify and evaluate existing chemical substitutions for foam and fabric flame retardants
  - Issue Green Chemistry Challenge to encourage environmentally-preferable flame retardants
- Green Engineering Solutions: Sustainable Design of Products and Processes
  - Identify and evaluate barrier technologies
  - Identify and evaluate alternative formulation of foams
  - Issue Design Challenge to address environmental impact of entire supply chain

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These approaches focus on both the materials and the chemicals used in furniture including: foam, fabric, plastics, and batting and their respective flame retardant chemicals. The partnership will focus initially on foam and secondly on fabric. The partnership aims to look at the performance of furniture holistically – including cost, functionality and environmental, human health and fire safety attributes.

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Identifying alternative solutions to meeting fire safety requirements will require research, to include working with chemical manufacturers, foam manufacturers, and other industry experts both in the U.S. and internationally. Gathering existing testing data and other information on alternatives will help the partnership select a set of alternatives to evaluate.

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Evaluation of selected alternatives will be based on a streamlined Cleaner Technologies Substitutes Assessment (CTSA) tool developed by EPA. The CTSA methodology is a systematic approach for evaluating risks to human health and the environment, as well as the performance, costs, and natural resource use of traditional and alternative technologies. A CTSA provides detailed information so that businesses can make their own decisions about cleaner technologies.

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In addition to evaluating already existing alternatives, this partnership will also issue a Green Chemistry Challenge through EPA's Presidential Green Chemistry Challenge Awards Program. This program creates an opportunity for individuals, groups, and organizations to compete for annual awards recognizing innovations in cleaner, cheaper, smarter chemistry. This particular challenge would be focused on creating a flame retardant that meets specific environmental, performance and cost criteria.

The partnership may also issue a green furniture design challenge as another approach to creating new alternatives. One of the intentions of this cradle-to-cradle design challenge would be to encourage the furniture supply chain to incorporate sustainable design principles in their products.

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Exploring these approaches will engage a variety of stakeholders, including furniture manufacturers, foam manufacturers, product safety groups, industrial designers, chemical companies, and environmental groups. This process may result in clear solutions, or may demonstrate the need for incremental improvements and additional research.

It is likely that no one approach will provide a solution for all applications. However, developing a menu of the available options and their strengths and weaknesses will give members of the industry the information they need to move toward cleaner alternatives.

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## Guiding Principles

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The project partners discussed several principles to guide project activities and outcomes. They are:

- Focus on flame retardant chemicals first, other [environmental](#) issues later.

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Don't push one answer: consider multiple solutions. We set the performance criteria and let others meet it - allows for innovation/ingenuity.

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- Not shooting for perfection; rather, best solutions based on best information available now.

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Solution shouldn't disadvantage anyone.

- Minimize the likelihood of future surprises.
- Avoid giving furniture industry a "black eye".
- Drop in solutions preferable.
- Consider process impacts.

- Consider whether chemicals will [volatilize](#) to the extent that they cause undue environmental and human health harm, and loss of flammability.

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- Consider toxicity and exposure pathways.
- Consider flame retardants in all materials: foam, fabric, plastics, [batting](#).
- Consider how cleaning solvents will affect flame retardants.
- Consider wide array of impacts, e.g. Canadian fire standards.

- [Field](#) tests need to be done by objective evaluators.

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- EPA and Furniture Mfg. Partners should drive the process: suppliers brought in as/when needed.

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- Keep the steering committee small, otherwise unmanageable and expensive.
- Keep others informed along the way.
- Create a centralized information source/process.

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