TECHNICAL BRIEF

# A National Taskforce on Residential Upholstered Furniture Flammability and Human Health

Chemical Insights
An Institute of Underwriters Laboratories Inc.

## Background

**The Science.** Chemical Insights held its first National Summit on Furniture Flammability and Human Health in 2014 at Georgia Institute of Technology, bringing together more than 75 different stakeholders representing furniture manufacturers, material suppliers, public health experts, academic researchers, fire fighter professionals and fire experts, flame retardant manufacturers, public health advocates, and policy makers. The goal of the first meeting was to gather available scientific knowledge surrounding fire safety and chemical safety of residential upholstered furniture and to begin exploring how to achieve both safety features without sacrificing one over the other. The 2014 Summit Proceedings were published.

The group was reconvened at Georgia Institute of Technology in 2015, where more data was made available indicating that both fire hazards and chemical exposure risks are present when residential upholstered furniture is used in indoor environments. Working groups developed a research agenda that could bring additional data forward to further understand: 1) the role of flame retardants and other technologies in mitigating fire risks of upholstered furniture and 2) the risk of human exposure to flame retardants if used in the material formulation of furniture components.

Available scientific data at that time indicated that flame retardants were present in human biological systems and could also be found in residential dust surrounding furniture. It was also known that most polyurethane foam used for furniture seating contained added flame retardants. However, there was little data indicating how consumers were getting exposure to the flame retardants present in furniture, and if so, how much. With this gap of science information, it was difficult to evaluate human risks and develop solutions to reduce chemical flame retardant exposure.

**Research Agenda.** Chemical Insights, with its toxicology laboratory and human exposure chambers, teamed up with additional expert partners to conduct this research. These included: Emory University Rollins School of Public Health, experienced in flame retardant exposure research; the Fire Safety Research Group of UL, LLC, equipped with extensive large scale burn laboratories; and a U.S. manufacturer of residential upholstered furniture to execute the research plan. Research was completed and preliminary results were presented in a third Summit with stakeholders in December 2017, held at Emory University. The research was successful in developing analytical methodologies for measuring human exposure to flame retardants used in furniture components; measuring human exposure levels to flame retardants used in furniture; and measuring open flame performance of furniture manufactured with and without flame retardants and with the use of a barrier material. In summary, it was shown that flame retardant exposure occurs from inhalation, ingestion of dust, and dermal transfer from furniture use. It also showed that there was little flammability performance difference among chairs made with and without FRs with amounts commonly added to furniture foam in the U.S. A remarkable improvement in flammability prevention was observed when a mechanical barrier material was added as a layer between the cover fabric and the polyurethane foam seating material. This study showed that both fire and chemical exposure safety could be achieved by using a fire barrier material without any flame retardants, and that one safety measure did not have to be sacrificed for another. The final study was published in September 2020. The full report, published in April 2019, and the video showing flammability performance of the differently constructed chairs are now available.

## Residential Upholstered Furniture Flammability and Human Health (FFHH) Taskforce

In February 2020, Chemical Insights provided an informational webinar to designers, suppliers and manufacturers of residential furniture to highlight research findings. Following the webinar and release of the extended research, performed by Chemical Insights and Emory University Rollins School of Public Health, a call was initiated for volunteer stakeholders to assist in developing a guidance document presenting the knowledge and processes for minimizing chemical exposure potentials and fire hazards of residential upholstered furniture.

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## FFHH Taskforce Objectives

The FFHH Taskforce objectives were to provide a forum for knowledge and suggested actions related to harmonizing efforts on Furniture Flammability and Health. Specific objectives included:

- Development of guidance documents on achieving both fire and chemical safety of residential upholstered furniture
- Development of "safer choice" educational materials for designers and consumers

## FFHH Taskforce Processes

The taskforce organized into working groups based on expertise areas of fire, health, and design. These working groups were conducted by a series of online workshops to develop the guidance document. The first meeting was held in May 2020 and is continuing every two months with an objective of finalizing the materials by the end of 2020. Ultimately, the FFHH Taskforce desired outcome is to provide a user-friendly Guide for residential interior designers and consumers. In addition to the guidance materials, supplementary resources such as an online toolkit and presentation are in development to support best practices for harmonizing fire and chemical safety of furniture, without having to choose one aspect of safety over the other.

## FFHH Taskforce Participants

Document preparation is being managed by Dr. Debra Harris of RAD Consultants and Baylor University. Dr. Harris is joined by the staff of Chemical Insights and Dr. Barry Ryan from Emory University in gathering data, drafting, and working with stakeholders. Key participants and experts in the working groups include: Research Institutes, Furniture Manufacturers, Industry Associations, National Testing Laboratories, Chemical Suppliers, Designers, and Furniture Retailers.

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