



Alternatives to Deca-BDE in Televisions and Computers and Residential Upholstered Furniture

Implementation of RCW 70.76: Identifying safer and technically feasible alternatives to the flame retardant called Deca-BDE used in the electronic enclosures of televisions and computers and in residential upholstered furniture

Final Report

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Executive Summary

This report fulfills the requirements of RCW 70.76, signed into law by Governor Gregoire in 2007. This law restricts the manufacture, sale and distribution of products containing a type of chemical flame retardant called PBDEs (polybrominated diphenyl ethers). The three types of PBDEs used in consumer products are Penta-BDE, Octa-BDE and Deca-BDE. The prohibition became effective for all products containing Penta-BDE and Octa-BDE, and for mattresses containing Deca-BDE in January, 2008. At the time the law was passed, safer alternatives for Deca-BDE had not been identified for other products, specifically, residential upholstered furniture, and electronic enclosures used in televisions and computers. RCW 70.76 lays out a process for identifying the availability of safer, technically feasible alternatives to Deca-BDE that meet fire safety standards for these applications. When safer alternatives are identified, the manufacture, sale or distribution of upholstery and electronic enclosures containing Deca-BDE will be prohibited two years from the date of identification.

As required by RCW 70.76, the Departments of Ecology (Ecology) and Health (DOH) reviewed risk assessments, scientific studies, and other relevant findings regarding alternatives to the use of Deca-BDE in residential upholstered furniture, televisions, and computers.

The agencies identified a safer, technically feasible alternative chemical flame retardant for TVs and computers. Non-chemical alternatives were identified for upholstered furniture. These alternatives were presented to a committee of fire safety experts appointed by the governor to determine if they can provide appropriate fire retardant capacity. The Fire Safety Committee met on November 7, 2008 and found that the identified alternatives meet applicable fire safety standards. The Fire Safety Committee reported its findings to the Office of the State Fire Marshal who, on November 18, 2008, determined that the identified alternatives meet applicable fire safety standards.

Ecology posted the draft report on its web page and notified the public and stakeholders about its availability. Public comment was accepted from November 20 until December 17, 2008. A notice was placed in the State Register on December 3, 2008 as well. A response to these comments is included in Appendix 6.

Alternatives Assessment Approach

RCW 70.76 requires that Ecology and DOH review risk assessments, scientific studies and other relevant findings to determine if a safer and technically feasible alternative to Deca-BDE is available. The statute requires that the agencies assure that at least one safer alternative is available. The agencies interpret “safer and technically feasible” as including:

- A chemical alternative to Deca-BDE that is less toxic, less persistent or less bioaccumulative than Deca-BDE, and that is currently being used in products, or

- A technology, material or other design strategy, currently in use and reasonably available, that provides fire safety for televisions, computers or upholstered furniture without the addition of chemical flame retardants. For example, while some electronic enclosures achieve fire protection through the use of metal instead of plastic, Ecology believes that requiring redesign to this extent may go beyond the definition of "feasibility" in the statute.

The agencies did not evaluate every option and therefore this report makes no assertion as to the relative safety of flame retardants or technologies we did not evaluate. Ecology and DOH do not have the regulatory authority to dictate what method furniture manufacturers select to maintain fire safety.

The statute does not require that the identified safer alternative be a direct substitute for Deca-BDE but does require that the alternative be "technically feasible". Ecology determined that a good indicator of technical feasibility is the presence and reasonable availability of the product on the market using the alternative. For example, if Ecology demonstrates that currently available computers are employing the identified alternative to Deca-BDE, then that alternative is considered technically feasible.

Electronic Enclosures for TVs and Computers

There are many available chemical flame retardants that can be used to provide fire safety for televisions and computers. In evaluating alternatives to the use of Deca-BDE in electronic enclosures, Ecology and DOH focused on non-halogenated flame retardants which are less likely to persist in the environment and to bioaccumulate in organisms. Non-halogenated alternatives also have the added benefit of being much more easily degraded than their halogen equivalents, thereby reducing their potential long-term impact on human health and the environment.

Technical feasibility was evaluated using indirect information because manufacturers do not generally reveal which chemicals are actually being used to provide fire safety in their electronic products. Ecology looked first to Europe, where Deca-BDE has been banned in electronic products since July, 2008. Ecology assumed that if these products can be made cost effectively and sold in Europe they can be made cost effectively and sold in the U.S. as well. Several European studies demonstrate that resorcinol bis(diphenyl phosphate) (RDP) has been used in electronic enclosures for televisions and computers sold in Europe. Also, the computer industry has largely moved away from use of halogenated flame retardants. Ecology and DOH did not identify technically feasible design options for televisions and computers that do not require the use of added flame retardants so these alternatives were not considered feasible.

After reviewing recent studies, reports and other information, most of which became available after the PBDE Chemical Action Plan was completed, Ecology and DOH identified two possible phosphate-based flame retardants: resorcinol bis diphenyl phosphate (RDP) and triphenyl phosphate (TPP), as technically feasible alternatives.

The agencies then conducted a review of information available on these two flame retardants to determine if both could be recommended as safer alternatives to Deca-BDE. This review included a comparison of toxic effects levels observed in animal studies and an evaluation of aquatic toxicity information.

Based upon this evaluation, the agencies found that RDP is a safer and technically feasible alternative to Deca-BDE. TPP was eliminated due to concerns related to its aquatic toxicity.

Plastics used in electronic products are rated for their flame retardation capacity using a voluntary standard identified by the National Fire Protection Association (NFPA) in conjunction with the Underwriters Laboratory (UL), which defines the specific method. The agencies presented information to the Fire Safety Committee on the performance of RDP compared with Deca-BDE when used in electronic enclosures. RDP performs as well as Deca-BDE, although a different type of plastic has to be used. As required by RCW 70.76, the Fire Safety Committee voted on whether or not RDP provides appropriate fire protection. The committee unanimously found that RDP meets applicable fire safety standards.

FINDING

A safer, technically feasible alternative to Deca-BDE, which meets applicable fire safety standards, is available for use in televisions and computers.

Residential Upholstered Furniture

For residential upholstered furniture, Ecology and DOH relied on information from the Consumer Product Safety Commission (CPSC) about the current use of Deca-BDE in furniture sold in the U.S. and the availability of furniture design options that do not require the addition of chemical flame retardants. Ecology and DOH decided to focus on design alternatives that use inherently flame resistant materials, rather than evaluate options that use added chemical flame retardants. Since there are currently available design options that can be used to achieve fire safety, the agencies focused on these instead of evaluating the safety of other chemical flame retardants that could be used to comply with the proposed standards.

The CPSC recently published a proposed flammability standard for residential upholstered furniture. Under the CPSC's proposed standard, fire safety in upholstered furniture can be achieved through the use of compliant cover materials (fabrics) or internal barrier layers. The proposed standard does not rely on the addition of chemical flame retardants, such as Deca-BDE, for compliance although flame retardants could be used. If the proposed standard is finalized as such, furniture manufacturers will have the option to meet fire safety requirements through several currently available design options that use inherently flame resistant cover fabrics or internal barriers. For example, many existing cover materials, especially those made from synthetic fibers, can meet the proposed standard without the addition of chemical flame retardants.

Furniture manufacturers could also comply with the CPSC proposed standard by using internal barrier materials, some of which may require the addition of chemical flame retardants. Inherently flame retardant barrier technologies that do not require the addition of chemical flame

retardants are available similar to those currently being used to achieve fire safety in mattresses. The CPSC estimates that the use of barrier materials in general as a method to comply with these standards is not a popular choice among manufacturers and would likely be used in only about 5 percent of upholstered furniture. Chemical flame retardants are most likely to be used in internal barriers under the CPSC proposed standard, but they are not expected to be widely used because many cover fabrics will comply. Although the CPSC flammability standard for residential furniture has not been finalized, it is expected that design options will be available to meet any additional requirements in a final standard.

California is the only state that currently has a flammability standard for residential upholstered furniture and Deca-BDE has not been used to meet this standard. According to CPSC staff, Deca-BDE is currently not being used by furniture manufacturers to comply with the California standards nor would it be used to comply with the proposed CPSC standards. Therefore, any ban on the use of Deca-BDE for this purpose in Washington would not impose new costs or require manufacturers to retool their processes or redesign their products in order to comply with this prohibition.

Based on furniture design options that are already available, the agencies concluded that the safer, technically feasible alternative to Deca-BDE in residential furniture is non-chemical design options. The Fire Safety Committee voted on whether or not these non-chemical design changes can provide appropriate flame retardation. The committee unanimously found that non-chemical alternatives meet the proposed federal CPSC fire safety standards for residential upholstered furniture.

FINDING

Safer, technically feasible alternatives to the use of Deca-BDE, which meet the current and proposed applicable fire safety standards, are available for use in residential upholstered furniture.

CONCLUSIONS

Safer, technically feasible alternatives to the use of Deca-BDE in TVs, computers and residential upholstered furniture are available and meet applicable fire safety standards. The restrictions on the use of Deca-BDE in these products as defined by RCW 70.76 will take effect on January 1, 2011.