



Flame retardants in IT Products

Improving knowledge about non-halogenated substances

Backgrounder from TCO Development. November 2015

1. Hazardous substances in IT products

- toward more sustainable, toxic-free electronics

Chemicals, many of them toxic for humans and the environment, are included in most manufactured goods. Electronic devices such as computers contain a wide variety of chemicals and other hazardous substances, such as flame retardants in plastic chassis and housings, cables and other components. An average computer can contain up to one thousand or more different materials. The vast majority of chemicals available today have not been officially tested for human health or environmental impacts. While many hazardous substances – halogens for example – have been phased out of electronic products, too little is known about the chemical substances being used to replace them.

Many chemical substances, especially flame retardants used in plastics, are cause for concern throughout the product life cycle; from manufacturing, use and end of life handling, where they can migrate into the natural environment, increasing ecological and human health risk. In the current environment of shorter product cycles and rapid technology development, there is an urgency to move toward a safer product life cycle for IT products.

Brominated and chlorinated flame retardants, often referred to as “halogens” are of particular concern as they have been shown to persist and bio-accumulate in flora and fauna. Thanks to reduction efforts, including the [RoHS directives](#) for electronic products and [TCO Certified](#), halogens have been largely phased out and replaced with non-halogen alternatives. The challenge now is to make sure that this phase-out does not risk a shift toward alternative substances with more hazardous effects. Assessing the risks and increasing our knowledge about alternative non-halogenated substances is one of the next challenges in creating toxic-free electronics.

The total number of alternative substances is vast and difficult to assess. Evaluating their potential effect on human health and the environment is complex, time consuming and resource intensive. As industry replaces halogenated substances with non-halogenated alternatives, we need to know more about their composition and potential risk throughout the life cycle.

2. The challenge

- reduce risk and improve knowledge about chemical content

The sheer number of commercially available chemical substances provides some insight into the challenge of identifying their properties and risks. There are over 143,000 chemicals commercially available in the EU alone according to the EU REACH registration records. It is expected that up to [70 000 registrations will be prepared by the 2018 deadline](#). These figures may be a reasonable guide to the approximate number of chemicals in commerce globally.

For example, the US Environmental Protection Agency adds an average of about 700 new chemicals per year to the [Toxic Substances Control Act \(TSCA\)](#) inventory. For a majority of these substances, especially those that have been on the market since before these regulations were in place, very few have been tested for safety and environmental effects.

To date – most legislative and voluntary programs have been aimed at banning chemical substances that have been identified as a risk to human health or the environment. These efforts include REACH, the CLP Regulation (Classification, Labelling and Packaging) that came into force in January 2009, and the EU Directives it replaced; the Dangerous Substances Directive 67/548/EEC and the Dangerous Preparations Directive 1999/45/EC.

To maintain flame resistant qualities, industry has worked to find non-halogenated alternatives that are not on lists of banned or phased out substances. The problem is that our knowledge of these alternatives and their potential risk is limited. There is a need for tools and methods to assess their relative social and environmental risks, a process that is complex and time consuming to implement.

3. The New Generation TCO Certified

– phasing out hazards and increasing knowledge

TCO Certified has included criteria for reducing toxic chemical content in electronics since 1995, which is before legislation was in place to restrict the inclusion of brominated and chlorinated flame retardants. As the program has evolved, criteria have included compliance with legislation such as RoHS, but have often set tougher thresholds.

The New Generation TCO Certified, in effect beginning November 2015, includes a new approach to phasing out hazardous, non-halogenated substances - those used to replace the largely phased out halogens. The idea is to obtain more information about their presence in plastics, with the goal of further driving a shift toward safer alternatives.

For this new criterion we are referencing the hazard assessment and decision logic framework [GreenScreen™ for Safer Chemicals](#), developed by the US-based non-profit organization Clean Production Action (CPA). The GreenScreen methodology can be used for identifying substances of high concern and as well as less-hazardous alternatives.

The GreenScreen evaluation of a substance covers 18 human and environmental health hazard endpoints. Each of the 18 hazards receives a classification of concern ranging from Very High to Very Low. Based on these classifications, a substance is assigned an overall benchmark score of 4, 3, 2, 1 or U, with benchmark 1 designating those substances considered Substances of High Concern and substances with benchmark 4 considered preferable. A benchmark 1 designation is the equivalent of REACH definition of Substances of Very High Concern. A substance can be assigned U (Undefined) if data gaps make it impossible to assign a benchmark.

4. Assessing non-halogenated substances

- GreenScreen™ For Safer Chemicals and TCO Certified

All substances achieving a GreenScreen benchmark are assessed by licensed profilers accredited by Clean Production Action to carry out Green Screen Assessments. In TCO Certified, substances achieving a GreenScreen benchmark 2 or better are accepted for compliance with the criteria for non-halogenated substances.

Benchmark 4	Few concerns	Preferable
Benchmark 3	Slight concern	Improvement possible
Benchmark 2	Moderate concern	Use but search for substitutes
Benchmark 1	High concern	Avoid
Unspecified	Insufficient data to assign a benchmark	

Brands applying to certify their products submit a chemical assessment carried out by a licensed GreenScreen profiler. TCO Development publishes a list of accepted substances at www.tcodevelopment.com. The [TCO Certified Accepted Substances List](#) is dynamic, which allows new substances that have undergone a valid assessment to be added or for accepted substances to come under reassessment in light of new scientific findings.

Transparent results – better information for end users

Information transparency is an important aspect of supporting an industry-wide shift to safer flame retardant substances with known health and environmental effects. The TCO Certified Accepted Substances List is publicly available on www.tcodevelopment.com and the purpose is to provide transparent information on the non-halogenated chemical content included in certified product models.

Currently there are twelve substances on the List. All have been reviewed and the benchmark was set by CPA approved profilers. It is anticipated that this list will grow as safer non-halogenated substances are tested and more widely used in electronics.

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For more information about GreenScreen, www.greenscreenchemicals.org

About TCO Development

TCO Development advances sustainable IT and is the organization behind TCO Certified, the third party sustainability certification for IT products. Professional IT purchasers worldwide choose TCO Certified products as part of their sustainable IT strategy. Products achieving TCO Certified meet a broad series of criteria to ensure that manufacturing, use and recycling is carried out with consideration for environmental, social and economic responsibility. TCO Certified is available for displays, notebooks, tablets, smartphones, desktops, all-in-one PCs, projectors and headsets.

TCO Development is headquartered in Stockholm, Sweden, with regional presence in North America and Asia.

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