



## Toxic chemicals criteria in depth

Greenpeace wants to see electronics companies clean up their act.

Substituting harmful chemicals in the production of electronics will prevent worker exposure to these substances and contamination of communities that neighbour production facilities. Eliminating harmful substances will also prevent leaching/off-gassing of chemicals like brominated flame retardants (BFRs) during use, and enable electronic scrap to be safely recycled. The presence of toxic substances in electronics perpetuates the toxic cycle – during reprocessing of electronic waste and by using contaminated secondary materials to make new products.

The issue of toxicity is overarching. Until the use of toxic substances is eliminated, it is impossible to secure 'safe' recycling. For this reason, the points awarded to corporate practice on chemicals are weighted more heavily than criteria on recycling. There are five criteria on chemicals as compared to four on waste and double points for vinyl plastic-free (PVC) and BFR-free models.

## A chemicals policy based on the Precautionary Principle

Greenpeace believes that companies should embrace strong principles that dictate decision-making on their environmental practices.

A chemicals policy underpinned by the precautionary principle means that companies take action to substitute/eliminate a suspect chemical or group of chemicals, even if the scientific jury is still out on whether these chemicals are definitely causing environmental harm. Implementing a precautionary chemicals policy requires a system for collecting information on new suspect chemicals and mechanisms for triggering corporate action to phase out the chemical and begin looking for safer substitutes.

### What is the Precautionary Principle?

The Precautionary Principle is not a new idea. It has been adopted by a number of international environmental treaties, conventions and political declarations. But what does it mean?

In the context of chemicals management, it means that when (on the basis of available evidence) the use of a chemical or groups of chemicals may harm human health or the environment, action to eliminate the use of the chemical(s) should be taken - even if the full extent of harm has not yet been fully established scientifically. The principle recognises that such proof of harm may never be possible, at least until it is too late to avoid or reverse the damage done.

Triggers for taking precautionary measures on chemicals could be new evidence of inherent hazards, such as persistence, bioaccumulation, carcinogenicity, mutagenicity, teratogenicity, hormone disruption or reproductive toxicity.

Top marks for this criterion go to companies whose definition of the precautionary principle includes taking action to substitute a chemical despite current scientific uncertainty (e.g. 'potential' effects) of its environmental and health effects.

## Chemicals Management

This criterion examines how companies manage their supply chain, in order to ensure that suppliers do not continue to use substances that are banned or restricted. Companies need to describe what systems they have in place to implement the phase out of harmful substances (like PVC, BFRs) and thus are in a position to meet their commitments.

A chemicals policy embracing the precautionary principle needs at minimum, a system for collecting information on new evidence on suspect chemicals and mechanisms for triggering corporate action to phase out these chemical and begin looking for safer substitutes.

Certain substances are already being considered for future elimination. These include other halogenated chemicals, in addition to PVC and BFRs, such as PFOS (perfluorooctane sulphonate) and related compounds, many of which have known hazardous properties. PFOS, for example, is a persistent, bioaccumulative and toxic substance. Other substances under consideration are antimony and beryllium compounds. Some antimony compounds are known to be toxic. Beryllium dust generated during electronic scrap shredding has the potential to harm recycling workers. As stated above, companies need to work towards the elimination of all hazardous substances, based on the precautionary principle.

Top marks for this criterion go to companies which make their lists of restricted/banned substances publicly accessible and describe how these requirements are enforced along their supply chain. In addition, companies need to provide lists of substances being considered for future restriction or elimination.

## Timeline for phasing out all use of vinyl plastic (PVC)

Greenpeace wants companies to eliminate all hazardous substances, based on the precautionary principle, but as a start, to phase out all substances on the OSPAR+ list. The 1998 'List of Chemicals for Priority Action' was drawn up by governments as part of the Oslo-Paris Commission for the Protection of the Marine Environment of the North-East Atlantic. Greenpeace extended this OSPAR list to include PVC in the so-called OSPAR+ list.

Polyvinyl chloride (PVC) is a chlorinated plastic used in some electronic products, including for insulation on wires and cables. PVC is one of the most widely used plastics but its production, use and disposal can create toxic pollution. Chlorinated dioxins and furans are released when PVC is produced or disposed of by incineration (or simply burning). Dioxins and furans are classes of chemical compounds widely recognised as some of the most toxic chemicals ever made by humans and many are toxic even in very low concentrations.

### Greenpeace defines 'PVC-free' as zero use of PVC, with no exceptions.

Top marks on this criterion go to companies that have committed to eliminating PVC in all applications, with a reasonable timeline by which phase out will be complete, or to those which have already fully implemented this commitment.

## Timeline for phasing out all use of brominated flame retardants

Greenpeace wants companies to eliminate all hazardous substances, based on the precautionary principle, but as a start, to phase out all substances on the OSPAR list, which includes all brominated flame retardants (BFRs). The 1998 'List of Chemicals for Priority Action', was drawn up by governments as part of the Oslo-Paris Commission for the Protection of the Marine Environment of the North-East Atlantic.

Greenpeace expects responsible companies to phase out all BFRs and not just those banned by the European Union's RoHS Directive.

BFRs are used in circuit boards, plastic casings and other plastic materials. Many do not break down easily and can build up in the environment. Some BFRs can bioaccumulate. Long-term exposure to certain BFRs, particularly in the womb, has been linked with abnormal brain development in animals, with the potential for impaired learning and memory functions. Some BFRs also interfere with thyroid and oestrogen hormone systems. TBBPA, a type of BFR used in circuit boards, has been linked to neurotoxicity.

The presence of high levels of BFRs in electronic products has the potential to generate brominated dioxins and furans, when the electronic waste comes to be smelted, incinerated or burnt in the open. Such dioxins and furans are classes of chemical compounds widely recognised as some of the most toxic chemicals ever made by humans and many are toxic even in very low concentrations.

## Greenpeace defines 'BFR-free' as zero use of brominated flame retardants, with no exceptions.

Top marks on this criterion go to companies that have committed to eliminating all brominated flame retardants in all applications, with a reasonable timeline by which phase out will be complete, or to those which have already fully implemented this commitment.

## PVC- and BFR-free models of electronic products on the market

Greenpeace defines 'PVC-free' and 'BFR-free' as zero use of vinyl plastic and brominated flame retardants with no exceptions.

The ultimate goal must be zero levels of total chlorine and total bromine. Some recycled plastics presently contain very low trace levels of total chlorine or total bromine. Both chlorine and bromine belong to halogens. For recycled materials, any maximum allowable limit for 'halogen free' must be demonstrated to be consistent with currently achievable minimum levels, and must incorporate stepwise decreases in the limit, with a defined timeline towards the ultimate goal of zero. Such a limit should apply to recycled plastics only, not to new or virgin materials, and only where truly halogen-free recycled materials are not available. Manufacturers must be able to demonstrate that recycled plastics used do not exceed their maximum allowable limit.

Various industry association standards use a definition of 'halogen free' that allows up to 900 ppm (parts per million) of total chlorine and 900 ppm of total bromine with a maximum total halogen level of 1500 ppm. These standards include JPCA's (Japan Printed Circuit Association) JPCA-ES-01-1999, IEC's (International Electrotechnical Commission) 61249-2-21 and IPC's 4101B. Greenpeace does not accept such high levels of halogens in materials that are misleadingly defined as 'halogen free'.

A material containing total bromine below 900ppm, and described as 'halogen free' could still contain certain BFRs (e.g. penta-BDE) over 1000ppm – exceeding the level banned by the European RoHS Directive.

Companies score double points for meeting this criterion. For top points, a company's whole product portfolio needs to be both PVC-free and BFR-free. PVC-free and/or BFR-free peripherals and accessories do not score points because they are not product systems.

**Ranking regrading:** Companies have the opportunity to move towards a greener ranking as the guide will be updated every quarter. However penalty points will be deducted from overall scores if Greenpeace finds a company lying, practising double standards or other corporate misconduct.

**Disclaimer:** Greenpeace's 'Guide to Greener Electronics' aims to clean up the electronics sector and get manufacturers to take responsibility for the full life cycle of their products, including the electronic waste that their products generate. The guide does not rank companies on labour standards, energy use or any other issues, but recognises that these are important in the production and use of electronics products.

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