

Human Rights Impacts of DecaBDE



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Impacts of DecaBDE Pollution on People

DecaBDE (decabromodiphenyl ether or BDE-209) is an additive flame retardant that is principally used in two categories of products: plastic polymers (main use) and textiles. In plastics, decaBDE is used in housing electronic and electrical equipment (e.g. televisions and set-top boxes, telephones, ducted air conditioning products), in construction and building materials, and in several other products. In textiles, decaBDE is used in upholstery, window blinds, carpet backings, curtains and mattresses in homes, hospitals, and other buildings. The most popular fabrics treated with decaBDE are blends of polyester, acrylic and viscose fibers.¹ DecaBDE is also likely used in foam for furniture and cushions.²

DecaBDE has severe adverse health effects. It can interfere with the normal functioning of our hormones [endocrine disruptor]³ and of the nervous system (on learning, memory and abnormal aging)⁴. It can also affect the reproductive system altering sperm and genitals, causing pathological stress [oxidative stress] and DNA abnormality [chromatin DNA damage].⁵ It is also suspected to cause cancer [carcinogenicity]⁶.

In recent years, countries around the world have banned or severely restricted the use of decaBDE. Since 2012 decaBDE is included in the EU Candidate List of substances of very high concern (SVHCs) under the Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (REACH).⁷ Since 2008 the use of polybrominated diphenyl ethers (PBDEs) is banned in electronic and electrical equipment (EEE), at concentrations above 0.1% by weight of homogeneous material, under the European Restriction of Hazardous Substances Directive (RoHS). Similar restrictions exist in North America and Asia.⁸

DecaBDE has recently been proposed for a global ban under the Stockholm Convention on Persistent Organic Pollutants. DecaBDE degradation may also contribute to the formation of lesser-brominated Polybrominated Diphenyl Ethers (PBDEs) and other metabolic products in organisms, which are bioaccumulative. Photodegradation of decaBDE may result in PBDEs from tri- to nona- and biodegradation of decaBDE may result in nona-, octa- and heptaBDEs.⁹ A number of those shorter chain PBDEs are already banned under the Stockholm Convention.¹⁰



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- As PBDEs are not chemically bound to the goods in which they are used, they are “*more likely to leach out of these products*”,¹¹ and there is evidence that decaBDE “*bioaccumulates and biomagnifies in several species of fish, birds and mammals as well as in food webs*”.^{12,13} Even though the primary routes of exposure are not well known, they are hypothesized to be dietary intake and exposure in the indoor environment (inhalation of indoor air).¹⁴ Because of its bio-accumulative nature, multiple exposures to low levels of decaBDE combine and eventually increase in the body.
- PBDEs, including decaBDE, are listed as chemicals of concern by the World Health Organization and United Nations Environmental Programme because of their endocrine disrupting properties.¹⁵ As these substances act as an endocrine disruptor, there is no safe level of exposure.¹⁶
- Children are particularly at risk. Foetuses can be exposed to decaBDE as it is transported through blood, cord blood¹⁷ and placenta.¹⁸ Infants and small children are also at risk of high exposure through breast milk,¹⁹ as well as from house dust and hand-to-mouth activity, which may result in greater ingestion of PBDEs than adults.²⁰ Workers are at risk of high-levels of occupational exposure, at all stage of the decaBDE life cycle, in particular those working in manufacturing and waste industries. White-collar workers are also subject to occupational exposure through dust of offices and businesses.
- The general public is exposed through household dust and food to these dangerous chemicals.

Human Rights Implications

Right to life

Under Article 6 of the ICCPR, “*Every human being has the inherent right to life. This right shall be protected by law. No one shall be arbitrarily deprived of his life.*” In addition, Article 6 of the Convention on the Rights of the Child (CRC) also recognizes that “*every child has the inherent right to life*” and that *the survival and development of the child is ensured to the “maximum extent possible”*.

According to the UN Human Rights Committee, “*The expression “inherent right to life” cannot properly be understood in a restrictive manner, and the protection of this right requires that States adopt positive measures. In this connection, the Committee considers that it would be desirable for States parties to take all possible measures [...] to increase life expectancy, especially in adopting measures to eliminate malnutrition and epidemics.*” (CCPR General Comment No. 06, 1982). Given the linkages between certain phthalates, non-communicable diseases and reduced life expectancy, the right to life is interlinked and interdependent upon the realization of numerous other human rights discussed below.

Right of children and adults to the highest attainable standard of health

Under article 12 of the International Covenant on Economic, Social and Cultural Rights (CESCR), “*The States Parties to the present Covenant recognize the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.*” CESCR also recognizes the right of workers to healthy working conditions.

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Specifically with respect to the rights of children, under Article 24 of the Convention on the Rights of the Child (CRC), “*States Parties recognize the right of the child to the enjoyment of the highest attainable standard of health [...] taking into consideration the dangers and risks of environmental pollution*” (emphasis added). Article 10 of CESCR also calls for “*special measures of protection and assistance should be taken on behalf of all children and young persons without any discrimination.*”

According to the Persistent Organic Pollutants Review Committee of the Stockholm Convention on Persistent Organic Pollutants (POPs), Persistent Organic Pollutants (POPs), “*there is evidence for adverse effects to critical endpoints including reproduction, survival, nerve- and endocrine systems. (C-) decaBDE is also degraded to lower brominated PBDEs, with known PBT/vPvB [Persistent, Bio-accumulative and Toxic/very Persistent and very Bio-accumulative] and POP properties. Lower brominated congeners contribute in the outcome of BDE-209 toxicity.*”²¹

Infants and small children are highly exposed to decaBDE in nursing and in accidental ingestion of house dust,²² but also through breast milk.²³ In proportion to their body volume, children drink more fluids, eat more food, breathe more air per kilogram of body weight.²⁴ They also have a larger skin surface area. Accordingly, they face higher risks of PBDE-related health effects than adults.²⁵

There is an inverse association of decaBDE concentrations with testosterone;²⁶ and negative effects can occur also on liver, thyroid, reproductive/developmental, and neurological development.²⁷

Higher levels of decaBDE are present in younger population under 30, and there is likely an age-dependent increase pattern because of extensive use of this compound since the 1980s. Based on this, a trend of increasing levels of decaBDEs and other PBDEs in the future studies can be anticipated, in particular if the use of decaBDE continues.²⁸

Exposure to decaBDE during critical windows of the children’s development can have a serious impact on their growth, causing severe lifelong consequences on their physical and mental health.

The persistent use of decaBDE threatened the realization of the right to health and other human rights, starting from childhood to adult life.

Right to adequate housing

Under article 12 of the International Covenant on Economic, Social and Cultural Rights (CESCR), “*The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate [...] housing, and to the continuous improvement of living conditions.*”



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DecaBDE can be found in indoor dust and air, as many upholsteries and plastic products containing this substance are commonly used at home. For instance, decaBDE can be found in computer dust.²⁹

The persistent presence of decaBDE in several house products is a threat to the life conditions, particularly of young children. Emissions of decaBDE to the environment occur at all stages of its life cycle, but service life has assumed to be one of the highest periods.³⁰ Its continued use hinders the full enjoyment of the right to adequate housing.

Right to access information

Under Article 19 of the ICCPR, “*everyone has the freedom to seek, receive and impart information and ideas of all kinds.*” Where human rights are violated due to toxic chemicals, gaining access to information is essential in order to give effect to other rights, such as due process, guarantees to a fair trial and the right to a remedy. There is wide recognition of the public’s right to know about toxic chemicals in the environment they live in. In addition, governments are increasingly recognizing the right to access information about toxic substances in products. The ILO’s Chemicals Convention (c.170) recognizes that workers have right to information about the hazards of chemicals used in the workplace, and employers have a duty to inform workers in this regard.³¹ Under Article 17 of the CRC, State Parties “*shall ensure that the child has access to information and material from a diversity of national and international sources, especially those aimed at the promotion of his or her ... physical and mental health.*”

However, lack of appropriate global legal framework still leads to products being improperly labeled. DecaBDE is present in everyday used products such as televisions, computers and curtains, dust and foods, without consumers’ awareness.³²

Such deficiencies of information must be considered and addressed in the development of global frameworks, such as the ‘Chemicals in Products’ project in development under the auspices of the United Nations Environmental Programme (UNEP). The program as currently developed does not guarantee the provision of adequate information to consumers.

Continued lack of information for consumers is a serious infringement of their right to access to information.

Access to effective remedy

Under Article 2 of the ICCPR, everyone has the right to an effective remedy for the violation of human rights. The third pillar of the UN Guiding Principles on Business and Human Rights is on the duty of governments to realize the right to an effective remedy, with several principles to aid in implementation.

The exposure to decaBDE without people’s consent is a violation of their human rights to health, adequate housing, and access to information among others. The situation is emphasized by the lack of a global legal framework, affecting the right to effective remedy.

In order to guarantee the enjoyment of this right, governments must undertake substantial reforms to guarantee access to effective remedy in case of decaBDE exposure.



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Workers Rights

In addition to the rights of workers mentioned previously, including the right to information, under Article 18 of ILO c.170 “[w]orkers shall have the right to remove themselves from danger resulting from the use of chemicals when they have reasonable justification to believe there is an imminent and serious risk to their safety or health.” In addition, workers also have the right to “information on the identity of chemicals used at work, the hazardous properties of such chemicals, precautionary measures, education and training.”

High decaBDE exposure affects workers that manufacture, handle, repair, and dismantle/recycle electronics equipment, textile and carpet workers, as well as workers that handle sewage sludge³³ and those who are occasionally in contact with this type of items, for instance sales and storehouse workers.³⁴

DecaBDE accumulates in workers tissues, and its level in computer technicians was found to be five times higher than in hospital cleaners and computer clerks.³⁵ Thus, its exposure is diffused among workers from a wide range of businesses, and not only in the decaBDE processing industry.

In addition, occupational exposure to decaBDE threatens the health and life of those supposed to benefit mostly from their use. Brominated flame retardants including decaBDE are commonly used in upholsteries and electronic devices that can be found at home and workplace. “[I]t was found that under early stages of burning more carbon monoxide may be formed in the presence of [...] fire retardants”.³⁶ Accordingly, there is concern for firefighters’ exposure in case of combustion, especially because most injuries and fire deaths result from the inhalation of toxic gases from more developed fires. On a study conducted on Californian firefighters “PBDE-209, PBDE-47 and PBDE-153 were prevalent congeners; PBDE-209 contributed >50% of the total PBDE concentration in four individuals, implying continuous occupational exposure to deca-BDE.”³⁷ Firefighters are also at increased risk of several types of cancer.³⁸

All of these workers may not have access to appropriate information on the risks of decaBDE exposure in occupational settings, nor resources to monitor exposure level in violation of their rights.

Right to Food and Water

According to Article 25 of the Universal Declaration of Human Rights and Article 11 of CESC “Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food”. The right to adequate food and water is established also in the Food and Agriculture Organization (FAO) Voluntary Guidelines to support the Progressive Realization of the Right to Adequate Food in the Context of National Food Security,³⁹ and the “access to, and consumption of, adequate, safe and nutritious food” (emphasis added) has also found protection under the Food Assistance Convention.⁴⁰

DecaBDE has extremely low water solubility, which makes diet the most important exposure route in aquatic and terrestrial food webs.⁴¹

Dietary sources are the major contributor to decaBDE body burdens for most adults, with decaBDE detected in many food types,⁴² especially those containing animal fat (e.g. oils, fish and shellfish, meat and meat products, and eggs).⁴³

Because of the lack of a safe exposure level of this bioaccumulative substance, the presence of decaBDE in food and water, whatever the amount, constitutes a violation of the enjoyment of the human rights to food and water.

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