

PCBs in Schools

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This Paper was developed to provide general information about the issue of polychlorinated biphenyls (PCBs) in schools.

What are PCBs?

Polychlorinated biphenyls or PCBs (trade name Aroclor) are a group of man-made chemicals produced in the U.S. from 1929 to 1979 (U.S. EPA, 2016). They have no smell or taste. The physical appearance of PCBs can range from a pale yellow oil to a brown waxy solid (typically thicker and more solid with increasing number of chlorines (Cl) in the compound; see Figure 1) (U.S. EPA, 2016). PCBs were used as insulators in electrical equipment such as transformers, as components in fluorescent light ballasts, as pigments in carbonless copy paper, and in paints, plastics, and rubber products to make them more pliable (U.S. EPA, 2016). PCBs do not easily breakdown in the environment and persist for a long time.

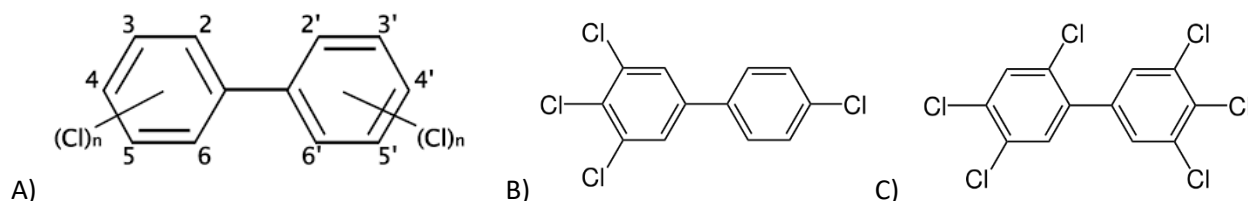


Figure 1: (A) basic chemical structure of a PCB where chlorine (Cl) can be found at any of the numbered positions on the biphenyl structure; (B & C) examples of PCB structures.

Where are PCBs typically found in schools?

PCBs were mostly used in schools built or renovated between 1940 and 1979 but could be present in schools built between 1929 and 1939. PCBs are typically found in sealants, caulking, grouts and paints, flame retardant coatings of acoustic ceiling tiles, and light ballasts (U.S. EPA, 2015; Lehmann et al., 2016; Markey, 2016). PCBs are most likely to be found in caulk around windows, in paint in boiler or maintenance rooms, in ceiling light ballasts, or soils in and around schools built or renovated in this time frame (Figure 2). All ballasts made between 1929 and 1979 should be assumed to contain PCBs and will not have a label indicating as such. These ballasts should be replaced (U.S. EPA, 20015). Ballasts made between 1978 and 1998 without PCBs were required to have a label that says “No PCBs”. All ballasts

made after 1998 do not contain PCBs and will not have a label. The explicit dates and labeling of light ballasts make them the easiest to replace. Laboratory testing would be required to know if paint and caulk in a school or other building contains PCBs if built between 1929 and 1979.



Figure 2: (A) Painted wall; (B) window caulking; (C) light ballast are all places where PCBs can be found in schools.

How might students and teachers be exposed to PCBs in schools and what are the health effects of PCBs?

Students and teachers can be exposed to PCBs from:

- being in rooms with fluorescent light fixtures that might leak PCBs into the air or onto the floor;
- breathing in PCB-contaminated dust;
- touching PCB-containing caulk or paint or contaminated soil around the school; and
- putting hands in or around their mouths after touching contaminated surfaces or materials.



Prolonged exposure to PCBs can cause adverse health effects such as skin irritation and disruptions in the immune, reproductive, nervous, and endocrine systems (U.S. EPA, 2012). And PCBs have the potential to cause cancer in humans (U.S. EPA, 2012). The people at most risk in schools containing building materials with PCBs are teachers who are exposed daily for up to 20 or 30 years and kindergarten to third grade students who are most likely to dig in dirt, touch cracked or crumbling paint/caulk, and also put their hands in or near their mouths (Herrick et al., 2016). There are medical tests that can be conducted to show if you have elevated levels of PCBs in your body, but they are expensive and do not predict health effects or treatment (IDPH, 2009).

What are the U.S. EPA regulations regarding PCBs in schools?

The U.S. EPA banned the use of PCBs in building materials in 1979 and is concerned about materials already in buildings, especially if PCBs are equal to or exceed 50 parts per million (ppm). This means that it is best to follow the building cleaning strategies outlined in the next section to reduce potential PCBs in buildings, particularly those built or remodeled between 1940 and 1979.

But, if remodeling or a teardown of such buildings is planned then **testing for PCBs is required by law** and should be done so that proper disposal practices can be met. If testing is not done,

then all material must be treated as if it contains 50 ppm or greater of PCBs and handled according to PCB disposal laws. The full U.S. EPA explanation of regulations and compliance follows:

“EPA regulations implementing the Toxic Substances Control Act (TSCA) prohibit the use of PCBs in caulk and other building materials manufactured with PCBs at levels greater than or equal to 50 ppm, including the continued use of such materials that are already in place. EPA regulations also generally prohibit the continued use of other materials that are contaminated with PCBs by such manufactured sources. Although EPA does have enforcement tools that it can use as appropriate where the PCB concentration in the caulk or other materials is above the regulatory limit, EPA is most interested in ensuring that school districts and other building owners undertake the recommended actions to limit exposures to PCBs. EPA believes that enforcement may not be the most effective tool to reduce health risks when school districts and other building owners follow these recommendations. Thus, such buildings will in most cases be a low priority for enforcement. Nonetheless, EPA will not hesitate to act in situations where there are significant risks to public health that are not being addressed.” (U.S. EPA, 2012)

What can schools do to protect the health of students and teachers?

The surest way to protect the health of students and teachers is to remove PCBs from schools when the compounds are known to be present. This can be done by (1) carefully removing and properly disposing of light ballasts from 1940-1979 and replacing them with high-efficiency lights that also improve energy efficiency (especially light ballasts that have PCBs leaking from them); and (2) test caulk and paint samples in schools built between 1940 and 1979 and taking the necessary remediation actions to remove materials that have PCBs in concentrations at or above 50 ppm (U.S. EPA, 2015).

Should these actions not be immediately feasible or if you are not sure if your school has PCBs, the U.S. EPA (2012) recommends the following actions to reduce potential exposure:

- Keep students away from peeling caulk and paint, and soil that may be contaminated with these items.
- Clean frequently to reduce dust and residue inside buildings.
- Use a wet or damp cloth or mop to clean surfaces.
- Use vacuums with high-efficiency particle air (HEPA) filters.
- Do not sweep with dry brooms and minimize the use of dusters.
- Have all staff and students wash their hands with soap and water after cleaning or recess and before eating or drinking.
- Make sure that school buildings are well-ventilated.



Questions

Questions regarding the content of this document may be addressed to the primary contact: Stephen Cospers at Stephen.D.Cospers@usace.army.mil or Elizabeth Meschewski at elm2@illinois.edu. If you have regulatory questions regarding PCBs in schools, please contact the U.S. EPA Region 5 (IL, IN, MI, MO, OH, WI) PCBs coordinator at 312-886-7890.

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