



PCBs 101

What You Need To Know to Plan, Protect and Prevent Exposure

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HIGHLIGHTS

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The EPA recently issued an alert that building owners and school administrators should take seriously. High levels of PCBs are correlated to long-term health effects such as cancer and damage to the immune, reproductive, nervous and endocrine systems.

PCBs 101

What are PCBs?

Polychlorinated biphenyls (PCBs) are man-made chemicals that currently exist in our environment. PCBs were widely used in construction materials, such as caulking plasticizers and electrical products prior to 1978. In 1976 congress banned the manufacture and use of PCBs and PCBs were phased out in 1978 except in certain limited uses.

In spite of this, high levels of PCBs still remain present in many buildings constructed prior to the ban. The U.S. Environmental Protection Agency (EPA) is concerned about the potential risks associated with chronic high-level exposure to these chemicals.

To address this concern, the EPA recently announced a series of steps that building owners and school administrators should take to reduce exposure to PCBs that may be found in caulk in many buildings constructed or renovated between 1950 and 1978. Currently regulations are not in place that require testing for PCBs, however until further research is conducted, the EPA recommends air testing for potentially high-levels of PCBs in at-risk buildings and direct testing of caulk that is peeling, brittle, cracking or visibly deteriorating.

Long-Term Effects

While almost everyone has very low levels of PCBs present in their bodies, studies have shown that chronic exposure to high levels of PCBs could be harmful to our health. In animal and human studies, PCBs were shown to cause effects on the immune, reproductive, nervous and endocrine systems. In addition, PCBs are potentially cancer-causing if they build up in the body over long periods of time.

Simple, cost-effective measures can be taken to reduce PCB exposure from building materials.

Mechanisms of Exposure

PCBs are present in the food we eat, the air we breathe, and in the dirt and dust that surrounds us. The EPA estimates that the average total PCB exposure ranges from approximately 3 ng/kg body weight per day for adults to 14 ng/kg/day for children from 1 to 2 years old.

Although PCB exposure is a serious issue, the potential presence of PCBs in buildings does not need to be a cause for alarm. Simple, cost-effective steps aimed at reducing PCB exposure can help to protect building occupants. Building owners and administrators can take steps to minimize exposure to PCBs by addressing contaminated caulk and other building materials that may contain PCBs.

If your building was built or renovated between 1950 and 1978, it is likely that PCBs are present in the caulk used in windows, door frames, masonry columns

HIGHLIGHTS

Caulking on buildings constructed between 1950 and 1978 can have a PCB concentration of as much as 30 percent.

and other masonry building materials. In some cases, caulk can contain a high concentration of PCBs, as much as 30 percent. The EPA believes that the presence of PCB-laden caulk in schools and other buildings is widespread. They recommend that deteriorating or flaking caulk be tested for the presence of PCBs and, if the caulk is found to have significant levels of PCBs, that it be properly removed by a qualified professional. This is because the PCBs found in the caulk can migrate from the deteriorating and chipping caulk into air, dust, surrounding materials and soil, causing a potential health concern for the building occupants.

The EPA has determined “reference dose” levels of PCB exposures – i.e. the amount of PCB exposure that EPA does not believe will cause harm. Those levels vary depending on the age group and use assumptions regarding potential PCB exposures in buildings and from other sources, such as diet.

Maximum Concentrations of PCBs in School Indoor Air (ng/m3)						
Assuming a background scenario of no significant PCB contamination in building materials and average exposure from other sources, these concentrations should keep total exposure below the reference dose of 20 ng/kg/day.						
Age	Age	Age	Age	Age	Age	Age
1 -<2 yr	2 -<3 yr	3 -<6 yr	6 -<12 yr Elementary School	12 -<15 yr Middle School	15 -<19 yr High School	19+ yr Adult
70	70	100	300	450	600	450

Source: PCBs in Caulk – FAQs; epa.gov

How to Reduce Your Risk

Building owners and school administrators should consider testing for PCB levels in the air to determine if levels in their building exceed the EPA’s suggested public health levels. If your building was built or renovated between 1950 and 1978, it likely contains PCB’s and the EPA recommends the following “best practices” to minimize potential exposure:

- Cleaning air ducts
- Improve ventilation by opening windows and using or installing exhaust fans where possible
- Clean frequently to reduce dust and residue inside the building
- Use a wet or damp cloth, or mop to clean surfaces
- Do not sweep with dry brooms and minimize the use of dusters in areas near potential PCB-containing caulk
- Use vacuums with high efficiency particulate air filters
- Wash hands with soap and water often, particularly before eating and drinking
- Wash children’s toys often

Prior to taking these steps building owners and school administrators should consider testing to determine pre-existing PCB levels in the air and then

HIGHLIGHTS

Caulking that is peeling, cracking or visibly deteriorating should be the greatest concern because it could be emitting PCB-laden dust into the air.

retest after these measures are taken to determine whether these ventilation and hygienic practices are reducing the potential for PCB exposure. If these measures do not reduce exposure, further action such as removal of caulk and other known sources of PCBs should be taken as soon as practicable.

Caulk that is peeling, brittle, cracking or visibly deteriorating is of concern because there is a greater chance it is emitting PCB-laden dust into the atmosphere. The EPA recommends this caulk be tested for the presence of PCBs and properly removed if PCBs are found at significant levels. In some cases, a building owner may assume the PCBs are present and proceed directly to removing the caulk without testing. In addition, if renovations or repairs such as replacing windows, doors, roofs, ventilation, etc. are planned for your building and it was constructed or renovated between 1950 and 1978, you will need to take steps to reduce PCB exposure. Renovations or repairs could significantly increase PCB exposure if handling of affected caulk is not properly addressed in advance.

Caulking materials that contain PCBs at levels of > 50 ppms must be removed during renovation or removal projects and PCB caulking must be managed as PCB-bulk product waste. The PCB caulking can be disposed in a solid waste landfill as long as the landfill is properly notified.

Steps to Find PCBs in Caulking

Kimball recommends that building managers take the following steps to address the potential for PCB in caulking:

- Review all building drawings and specifications to determine what materials could be present in window caulking, door frames, masonry materials, expansion joints, masonry columns and miscellaneous building materials. It should be noted that some older buildings could still contain PCB containing light ballasts, insulated electrical components and transformers.
- Test the indoor air of the building for PCBs.
- Assess the location and condition of the caulking and other building materials.
- Determine the potential exposure to the caulking and other potential materials.
- Adopt and promote safe work practices such as frequent cleaning, wet wiping of potentially contaminated areas, proper hygiene (frequent hand washing, reduced contact with the mouth by dirty hands, washing hands and face prior to eating), covering PCB caulking materials and improving air ventilation.
- Protect all PCB-contaminated materials from damage and attempt to reduce or eliminate contact by building occupants.
- Properly dispose of any contaminated materials.
- Provide informational talking points to building occupants, teachers, school advisory staff, parents and potential students. Make this a learning experience for all affected parties.
- To mitigate your future risk and add credibility to the process, hire an independent consultant to assist your staff.