PDHonline Course C639 (6 PDH)

PCBs in Building Materials – Into the Limelight

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http://www.epa.gov/pcbsincaulk/guide/
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Polychlorinated Biphenyls (PCBs)

Steps to Safe Renovation and Abatement of Buildings That Have PCB-Containing Caulk

- Overview
- Disclaimer
- Example of a Decision Flowchart for Classifying Suspect Building Materials

Overview

This information is designed to assist building owners and abatement contractors who may be handling PCB-containing or PCB-contaminated building materials during planned renovation or repair activities or planned PCB abatement efforts in older buildings. The following pages include information on:

- Facts about PCBs in Caulk - Provides basic information on PCBs and how to identify PCB-containing materials, primarily caulk.
- Steps to Safe Renovation and Repair Activities - Provides guidance on safe work practices during renovation or repair projects in older buildings where PCB-containing caulk and PCB-contaminated surrounding materials could be encountered.
- How to Test for PCBs and Characterize Suspect Materials - Discusses building characterization and sampling procedures to identify PCBs and determine the extent of contamination.
- Steps to Safe PCB Abatement Activities - Provides information on steps that should be considered for projects intended to remove and dispose of known or suspected PCB-containing caulk (i.e., PCB abatement activities). You can find the PCB regulations that support this information at Title 40 of the Code of Federal Regulations Part 761 (40 CFR Part 761).
- Summary of Suggested Tools and Methods for Caulk Removal - Describes tools for removal, advantages and disadvantages, and protective measures to consider in table format.

Disclaimer

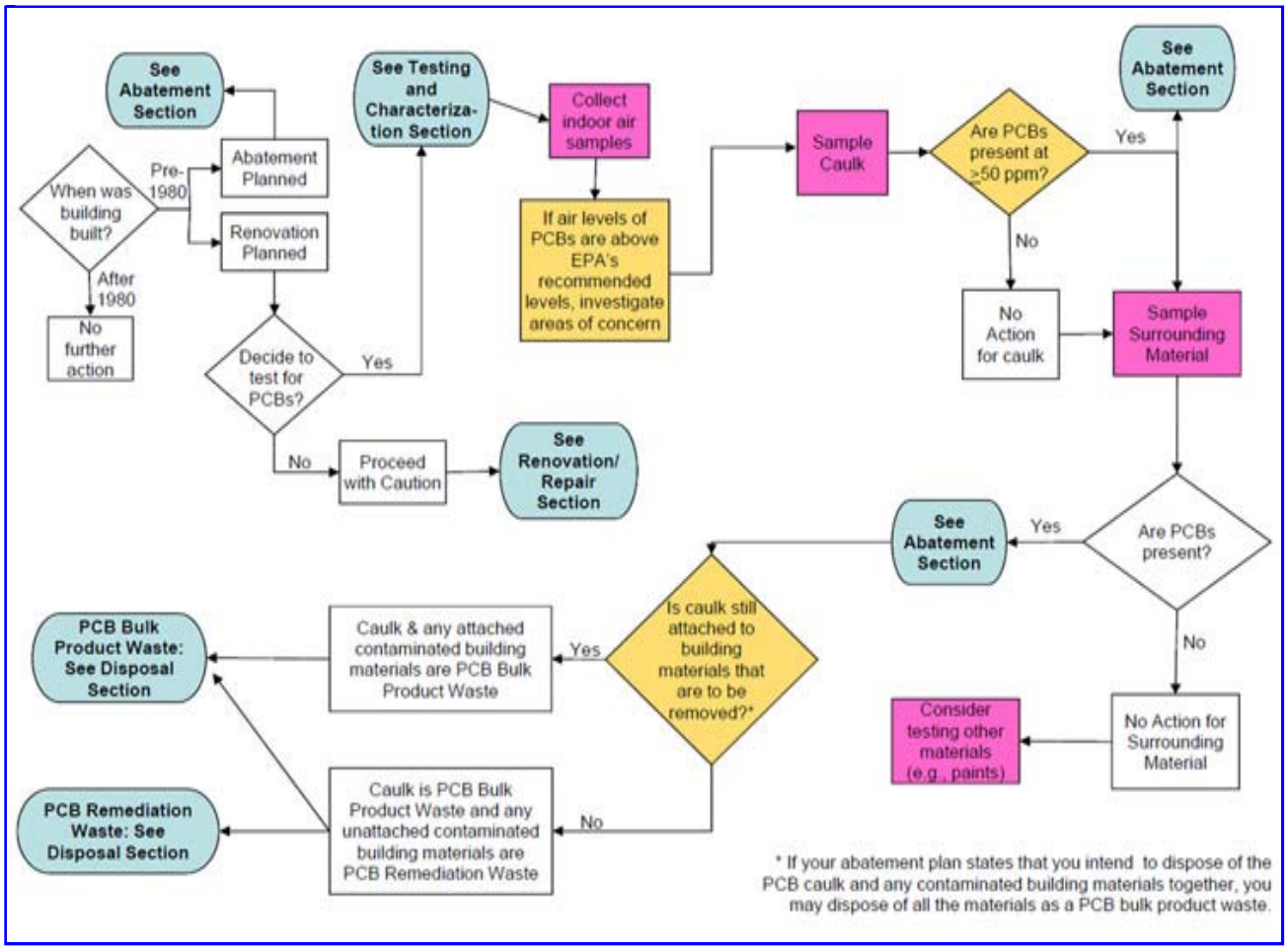
Regardless of the size of a project involving potentially contaminated building materials, contractors and building owners should be especially aware of the impact of their work in buildings occupied by high-risk populations, such as schools and daycare centers. The information provided in this document is intended solely for guidance and does not replace or supplant the requirements of the Toxic Substances Control Act (TSCA) or the PCB regulations at 40 CFR Part 761. Those responsible for renovation, repair, or abatement activities of potential PCB-containing or PCB-contaminated materials should review and understand the regulatory requirements, and are encouraged to consult the EPA or environmental professionals experienced with PCB cleanup activities. This document does not impose requirements or obligations on EPA or the public. The use of the word "should" in this document reflects an EPA recommendation, not a requirement.

In addition to the PCB regulations under TSCA, renovators and abatement personnel should also be aware that their activities may also disturb asbestos-containing materials and/or lead-based paint. Read more about EPA's regulations and guidance for lead-based paint and asbestos. The Occupational Safety and Health Administration (OSHA) also has standards and guidance on the hazards of lead and asbestos specifically for workers and employers.

The use of the term "caulk" in this document refers to any building joint, window, or door sealer or filler found on the inside or outside of a building.

Example Decision Flowchart for Classifying Suspect Building Materials

This flowchart (PDF) (1 pp, 32K, About PDF) can be used to help navigate through the information on this site.



Note:

- Items in blue above are links to relevant sections of this website
- Items in pink are potential sources of PCB contamination
- Items in yellow are EPA standards or levels of concern

Next page: Facts About PCBs in Caulk

http://www.epa.gov/pcbsincaulk/guide/guide-sect1.htm
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Polychlorinated Biphenyls (PCBs)

Facts About PCBs in Caulk

- What are PCBs and Why Should I be Concerned?
- Why Were PCBs Used in Caulk?
- How Do I Determine if My Building May Have PCBs?
- How Can Exposure to PCBs Occur?
- What are the Regulations Governing PCBs?
- Do I Need to be Concerned about PCBs if I am Conducting a Building Renovation?
- Where can I Get More Information about PCBs in Caulk?

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- Steps to Safe PCB Abatement Activities
- Summary of Tools and Methods for Caulk Removal

What are PCBs and Why Should I be Concerned?

Polychlorinated biphenyls (PCBs) belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; and as plasticizers in paints, plastics, rubber products, and building caulk. PCBs were manufactured domestically starting in 1929, until they were banned from manufacture in 1979.

Exposure to PCBs can cause a variety of adverse health effects in animals and humans. In animal studies, PCBs have been shown to cause cancer as well as serious non-cancer health effects. In humans, PCBs are potentially cancer-causing and can cause other non-cancer effects including immune system suppression, liver damage, endocrine disruption, and damage to the reproductive and nervous systems. Read more about the health effects of PCBs.

Why Were PCBs Used in Caulk?

PCBs were a common additive to caulk because of their water and chemical resistance, durability, and elasticity. PCBs were added as a plasticizer in caulking used to seal joints between masonry units and around windows. Caulk containing PCBs was used in some buildings, including schools, primarily between 1950 and 1980. PCBs were also used in other building materials such as paints, mastics, sealants, adhesives, and specialty coatings.

EPA does not have information on the extent of the use of PCB-containing caulk or whether it was primarily used in certain geographic areas. To date, it has been found in school buildings and other buildings in the northeastern, southern, and mid-western United

States. PCB-containing caulk has also been found in the joints in concrete water storage basins in the western United States, and in an airport runway in the Pacific Northwest.

How Do I Determine if My Building May Have PCBs?

The age of the structure can tell you a lot about whether PCB-containing caulk is likely to be present.

- If it was built or renovated between 1950 and 1980, it is more likely to have PCB-containing caulk.
- It is important to consider when additions or renovations were constructed. Some parts of the building may have been constructed or renovated later than others. More recent additions are less likely to contain PCB caulk and contaminated dust.
- PCB-containing caulk may be found either inside or outside the building, and is found in window caulk as well as masonry joint caulking.
- PCBs could also be present in other building materials including paints, mastics, sealants, and fluorescent light ballasts.

How Can Exposure to PCBs Occur?

Exposure to PCBs can occur by directly touching PCB-containing caulk and surrounding building materials or soil (dermal contact), hand to mouth contact after touching PCB-containing caulk and surrounding building materials or soil (ingestion), and breathing in air or dust contaminated with PCBs (inhalation).

PCBs may also be released into the surrounding soil from exterior caulk. Caulk that is not intact and is peeling, brittle, cracking, or visibly deteriorating in some way has a high potential to release PCBs into surrounding soil. PCB-contaminated soil can be a source of exposure for individuals who visit adjacent play areas or gardens.

Indoor air quality may be affected by PCBs. PCBs can slowly be released into the air from caulk and be inhaled. Caulk dust particles can come into contact with people in the building. They can also enter the air handling system and move to other areas of the building. In addition to deteriorating caulk, caulk with the highest PCB concentrations should also receive a high priority for removal, as these materials may pose a greater potential for direct exposure and release of PCBs to indoor air.

What are the Regulations Governing PCBs?

PCBs are regulated under the Toxic Substances Control Act (TSCA), which became law in 1976. TSCA bans the manufacture, processing, use and distribution in commerce of PCBs, and gives EPA the authority to regulate the use, manufacture, cleanup, storage, and disposal of PCBs.

The current PCB regulations were published pursuant to this Act, and can be found in Title 40 of the Code of Federal Regulations (40 CFR Part 761). The use of PCBs in caulk is not authorized under TSCA's PCB regulations. Caulk and surrounding contaminated building materials that have been removed are considered waste under the PCB regulations and must be cleaned up and disposed of in accordance with Subpart D of 40 CFR 761. Please consult with your state's PCB Regional Coordinator and environmental agency for the disposal options for this waste material.

In addition, states may have their own regulatory requirements applicable to PCBs. You should consult your state environmental agency for information on such requirements, if any.

Do I Need to be Concerned about PCBs if I am Conducting a Building Renovation?

Before you begin a renovation or repair job, consider whether PCB-containing caulk may be an issue. If your building was built in 1980 or later, you are unlikely to have PCB-contamination from caulk. If your building was built between 1950 and 1980, you have several options:

- You can assume you have PCB-containing materials but not remove them. You should renovate with caution however since caulk and surrounding materials may be contaminated with PCB; or
- You can proceed to test the air to determine if the PCB-containing materials are causing a potential public health problem and therefore should be removed.
- If you decide to remove the PCB-containing caulk and/or other materials, you are now doing an abatement project, and should refer to Steps to Safe PCB Abatement Activities.

Where can I Get More Information about PCBs in Caulk?

More information on PCBs in caulk may be found at EPA's PCBs in caulk Web page.

You may direct additional questions to the Regional PCB Coordinator for your state.

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http://www.epa.gov/pcbsincaulk/guide/guide-sect2.htm
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Steps to Safe Renovation and Repair Activities

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- How to Test for PCBs and Characterize Suspect Materials
- Steps to Safe PCB Abatement Activities
- Summary of Tools and Methods for Caulk Removal

This section highlights precautionary measures and best work practices to follow when conducting a repair or renovation in older buildings where PCB-containing caulk could be encountered or where you assume PCBs are present, but do not have an abatement planned. A building owner or contractor may be required to utilize additional safety measures based on individual building conditions.

- Are You Working on s Renovation or Repair Project of a School or Other Building?
- Safety Considerations: Employ Protective Measures (Interior and Exterior)
- Comply with Occupational Protective Regulations
- Communication with Building Occupants/Third Parties and Site Security
- Set up the Work Area to Prevent the Spread of Dust
- During the Renovation, Use Tools that Minimize the Generation of Dust and Heat
- Leave the Work Area Clean

Are you working on a renovation or repair project of a school or other building?

If so, you need to know how to work safely with potentially contaminated building materials. This section is designed to help contractors and building owners plan for renovation and repair projects that could disturb caulking and other building materials potentially contaminated with PCBs. Following the work practices discussed in this section will help reduce the exposure risk to workers and building occupants to PCBs. The suggested work practices will assist you in:

- employing protective measures during a renovation;
- leaving the work area clean and safe for building occupants after completing the job; and
- properly disposing of waste materials.

Safety Considerations: Employ Protective Measures (Interior and Exterior)

Depending on the type of building, scope of the project, and the potential volume of dust generated by the corresponding work methods, you should consider employing various protective measures. Protective measures should provide for direct personal protection of workers, protection of building users, and third parties (e.g., students, teachers, and passers -by), as well as safeguard against spreading PCB dust to other surrounding areas of the renovation project.

Comply with Occupational Protective Regulations

The Occupational Safety and Health Administration (OSHA) regulations at 29 CFR 1926.28(a) state that, "The employer is responsible for requiring the wearing of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions." Therefore, you should use suitable personal protective equipment (PPE) for dust-generating work methods.

The following generally applicable PPE should be considered:

- chemical-resistant gloves
- Tyvec disposable coveralls and shoe covers
- safety glasses or protective goggles
- respiratory protection

These protective measures should be sufficient to prevent PCBs from entering your body through inhalation, oral ingestion, and/or dermal contact (absorption through exposed skin).

In addition, worker hygiene is an important protective measure. Eating, drinking, and smoking should be prohibited in the work site. For work involving significant dust generation, showers and separate changing cabins for work clothing and everyday clothing should be provided.

Communication with Building Occupants/Third Parties and Site Security

Notify Building Occupants of the Work to be Performed

When your renovation and repair project may disturb materials that are potentially hazardous, protective measures for building occupants and third parties are critical. Clear communication with all affected groups (e.g. building occupants, workers, building owners, and community members) is necessary to create a safe working environment. For example, you should continually inform the affected groups of:

- the goals, type, and length of the renovation activities;
- health and safety aspects of the project; and
- site access requirements and limitations.

Keep a Secure Work Area

You should also use site security measures to prevent access of unauthorized persons to the work areas until after the final cleanup. Examples of security measures include:

- Lock fence gates or doors to the work areas during off hours.
- Place signs, barrier tape and/or cones to keep all non-workers, especially children, out of the work area. For apartment buildings or other dwellings, keep pets out of the work area (for their safety and to prevent them from tracking contaminated dust and debris outside the work area). Signs should be in the primary language of the occupants, and should say "Do Not Enter - Authorized Personnel Only" and "No Eating, Drinking, or Smoking."

- Establish a system to identify authorized persons and any limitations to their approved activities.
- Provide a means for approving all visitors to the work area; ensure trained site personnel accompany visitors at all times and provide them with appropriate PPE.

Set up the Work Area to Prevent the Spread of Dust

When working on a renovation or repair job with the potential for PCB-containing caulk, appropriate controls should be put in place to minimize spreading dust during the renovation and/or repair activity. At a minimum, consider separating work areas from non-work areas and select appropriate PPE and tools.

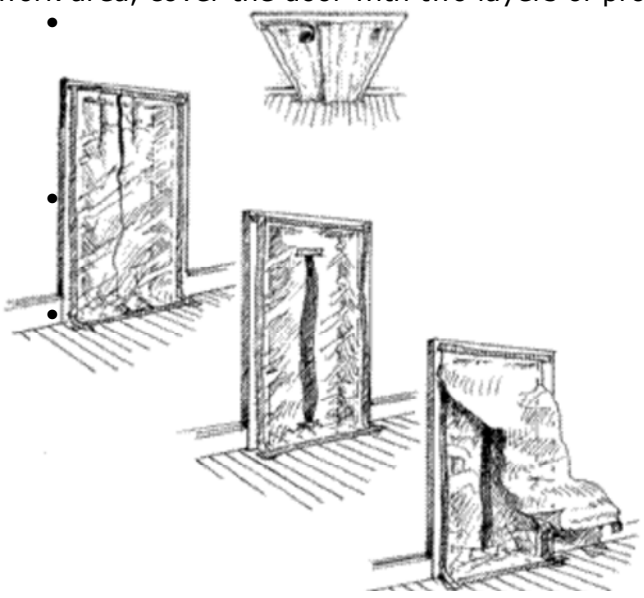
At a minimum, consider separating work areas from non-work areas and select appropriate PPE and tools.

Whenever potentially hazardous material is disturbed and could generate dust, the work area should be protected by constructing a containment area. Plastic sheeting can be applied to the floor, ground, or other applicable surfaces to prevent contamination of the building interior or exterior from dust generated by the work. Construct the containment area so that all dust or debris generated by the work remains within the area protected by the plastic. Placing the containment area under negative air pressure is also an effective tool. EPA also recommends the use of high-efficiency particulate air (HEPA) tools to minimize dust release. The size of the containment area and dust controls that will be used may vary depending on the size of the renovation or repair, the methods used, and the amount of dust and debris that will be generated as a result of the renovation or repair activities.

Inside the Building

The following techniques can be employed to prevent/minimize the spread of dust, which may contain PCBs, when working inside the building:

- Clear room of movable items such as furniture, books, wall hangings, etc.
- Use heavy plastic sheeting (e.g., 4- or 6- mil plastic) to cover floors in the work area. Secure with tape.
- Close all doors in the work area, including closet and cabinet doors, and cover with plastic sheeting. When the work area boundary includes a door used to access the work area, cover the door with two layers of protective sheeting as described here:



  - Cut and secure one layer of sheeting to the perimeter of the doorframe. Do not pull the sheeting taut. Rather, create a few folds to leave slack at the top and bottom of the door before taping or stapling.
  - To allow workers access, cut a vertical slit in the middle of the sheeting leaving 6" uncut at the top and bottom. Reinforce with tape.
  - Cut and secure a second, overlapping layer of sheeting to the top of the door. To allow worker access, do not secure the sides or bottom of the door.
  - Close and seal the ventilation system in the work area with tape and plastic sheeting. This will keep dust from getting into vents and

moving through the building. If possible, you should turn off your heating, ventilation and air conditioning (HVAC) system to prevent contaminating the system.

- Put all necessary tools and supplies on the protective sheeting in the work area before you begin work to avoid stepping off the protective sheeting before the work is complete.

Outside the Building

When working outside the building, the following techniques can be employed to prevent/minimize the spread of dust and debris:

- If at all possible, use heavy plastic sheeting to build an enclosure around the work area.
  - Mobile scaffolding is a convenient frame for constructing such an enclosure.
  - Utilizing a few two-by-fours and the door covering method described above, an entrance/exit to the enclosure can be created.
  - Use heavy plastic sheeting to cover the ground within the enclosure. Secure with tape.
  - Construct a decontamination area just outside of the enclosure by placing heavy plastic sheeting on the ground. This area is used to remove personal protective equipment and to clean equipment used in the enclosure.

For locations where a containment area cannot be constructed, the following techniques should be used, as appropriate:

- Cover the ground and plants with heavy plastic sheeting to catch debris. The covering should extend at least 10 feet out from the building. Secure the covering to the exterior wall with a wood strip and staples, or tape.
- Close windows and doors within 20 feet of the work area to keep dust and debris from getting into the building.
- Seal off any vents or air exchange systems into the building which are located within the work area.
- Move or cover any play areas within 20 feet of the work area.
- To prevent debris from falling beyond the 10 foot covering when working on the second story or above, extend the sheeting farther out from the base of the building and to each side of the area where materials are being disturbed.
- To prevent the spread of debris when work is close to a sidewalk, street, or property boundary, or the building is more than three stories high, scaffolding sides should be covered in plastic.
- Avoid working in high winds if possible. Otherwise, take special precautions to keep the work area contained when the wind is strong enough to move dust and debris. For example, a wind screen can be constructed of plastic at the edge of the ground-cover plastic to keep dust and debris from migrating.

After you construct an effective containment area, make sure you control the spread of dust outside your work area:

- Put all necessary tools and supplies on the protective sheeting in the work area before you begin work to avoid stepping off the protective sheeting before the work is complete.
- Remove or vacuum off Tyvec suits when exiting the work

area so the dust stays inside the work area.
- Every time you leave the plastic sheeting, remove your disposable shoe covers, and wipe or vacuum your shoes, especially, the soles, before you step off the plastic sheeting. A large disposable tack pad on the floor can help to clean the soles of your shoes.
- Change out of your work clothing before going home, and launder non-disposable protective clothing separately from family laundry.

During the Renovation, Use Tools that Minimize the Generation of Dust and Heat

Select tools and work methods that generate the lowest possible dust volume. Remember that as you scrape, drill, cut, grind, etc., you are creating dust. You can breathe in this dust while you are working, or as the dust settles, it can expose building occupants to contaminants.

Select tools and work methods that generate the lowest possible dust volume.

If your tools or work methods produce high heat (temperatures exceeding 212°F), PCB gases may be released into the air. This increases the risk that workers or building occupants may breathe in PCB gases. More comprehensive protective measures are necessary for methods that generate moderate to heavy amounts of dust or heat.

- Use tools that generate the least amount of dust and can still get the job done. Detailed information on tools can be found in Summary of Tools and Methods for Caulk Removal.
  - Manual tools, such as utility knives, chisels, and scrapers, generate lower volumes of fine dust and less heat, but are primarily used for smaller joint lengths or when the joints are difficult to access for structural reasons.
  - Electromechanical tools, such as oscillating knives, jigsaws, and rotary cutting tools, have ergonomic advantages over most manual methods, as they are better suited for projects with many joints and semi-soft to hard and brittle caulk; however, they generally generate higher volumes of dust and more heat, which requires more complex protective measures than manual methods.
- Grinding electromechanical tools generate large volumes of dust, and are therefore not recommended for the removal of potentially PCB-containing building materials, unless appropriate control measures are implemented (see the section on protective measures). Examples of such tools include angle grinders, masonry groove cutters, circular saws, and slot mills. Jigsaws and saber saws also lead to dust emissions, especially in the case of brittle caulk; furthermore, elastic compounds may gum up the saw blade.
- When using electromechanical tools tools, use HEPA vacuum attachments to contain the dust generated.
- For larger projects, use wet sanders and misters to keep down the dust created during sanding, drilling, and cutting.

Read additional information on tool selection and protective measures.

Leave the Work Area Clean

The work area should be left clean at the end of every day and especially at the end of the job. The area should be as free of dust and debris as possible. The following cleaning supplies, tools, and equipment you may need are available in hardware or garden supply stores:

- Heavy-duty plastic bags
- HEPA vacuum with attachments and a powered beater bar
- Masking tape, duct tape, or painters tape
- Misting bottle or pump sprayer
- Disposable wet-cleaning wipes or hand towels
- Detergent or general-purpose cleaner
- Mop and disposable mop heads
- Two buckets or one two-sided bucket with a wringer
- Shovel and rake

Daily Activities

On a daily basis, renovators should:

- Pick up as you go. Put trash in heavy-duty plastic bags.
- Vacuum the work area with a HEPA vacuum cleaner frequently during the day and at the end of the day.
- Clean tools at the end of the day.
- Dispose of or clean off your personal protective equipment
- Note that waste water produced during the job from mopping, wet cleaning, cleaning of equipment, or misting may be regulated for disposal by State and/or Federal authorities.
- Continue to separate the work area from the rest of the building and remind occupants to stay out of the area.

End of the Project Activities

When the job is complete, repair workers and/or renovators should:

- Make sure all trash and debris, including building components, are disposed of properly.
- Vacuum any exposed surfaces, including walls and ceilings, with a HEPA vacuum cleaner.
- Consider misting dusty sections of the plastic sheeting with water before taking them down. This will keep dust from becoming airborne again.
- Remove plastic sheeting carefully, fold it with the dirty side in, tape it shut, and properly dispose of it.
- Vacuum all surfaces again with a HEPA vacuum cleaner.
- Scrub the work area with a general-purpose cleaner on a wet rag or mop until dust and debris are removed.
- Visually inspect your work to ensure that no dust or debris is present.
- Re-clean the area thoroughly if you find dust or debris.

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http://www.epa.gov/pcbsincaulk/guide/guide-sect3.htm
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Polychlorinated Biphenyls (PCBs)

How to Test for PCBs and Characterize Suspect Materials

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This section applies if you are conducting a renovation in an older building and would like to test for the presence of PCBs in the building. EPA recommends that you first test the air to determine if PCBs may be causing a potential public health problem. This initial step may help prioritize the steps and/or approaches for the renovation or repair work. If you have identified a PCB problem, you will need to characterize it and determine the extent of PCB contamination. It is important to note that even if PCBs are not present in the air, they still may be present in the caulk and/or other building materials.

- Building Characterization and Sampling Plan
- Sample Collection Procedures
- Sample Documentation

Building Characterization and Sampling Plan

A sampling plan should be developed to characterize the caulk and other potential building materials that might either contain PCBs or be contaminated through contact with PCB-containing caulk such as wood, masonry, or brick. The sampling plan should consider the following steps:

1. Test indoor air to determine if PCBs are present above the levels of concern. For the reference doses, see Public Health Levels for PCBs in Indoor School Air.

If PCBs are at level of concern, determine the extent of the problem by:

2. Prioritize testing of caulk based on its condition, (e.g. higher priority caulk is that which is weathered, brittle, or deteriorating). See EPA's Caulk Testing Fact Sheet for more information.
3. Test the caulk to determine if PCBs are present at levels at or above 50 parts per million (ppm). Caulk that is removed and is 50 ppm or greater is regulated for disposal (see Abatement Step 3 and EPA's Caulk Testing Fact Sheet for more information)
4. Evaluate caulk sample results and determine if surrounding materials warrant testing.
5. Outline areas requiring corrective action and prioritize contaminated building materials for removal based on their PCB-concentration levels, potential accessibility, and building occupancy (see Abatement Step 1 for more details).

Sample Collection Procedures

The sampling plans may require the collection of any of the following sample types:

- Bulk solid samples (e.g., caulk, soil, sand)
- Porous surface samples (e.g., concrete, asphalt, wood surfaces)
- Non-porous surface wipe samples (e.g., unpainted metal window frames, polished granite)
- Indoor air samples

The following paragraphs describe the sample collection procedures for each of these sample types. For these various sample types, a sufficient size sample should be collected to ensure the laboratory can measure the concentrations of PCBs at levels required by the PCB cleanup and disposal regulations at 40 CFR part 761.61. It is recommended that you contact the analytical laboratory or your Regional PCB Coordinator to discuss the necessary requirements for each sample type.

... a sufficient size sample should be collected to ensure the laboratory can measure the concentrations of PCBs at levels required by the PCB cleanup and disposal regulations ...

Bulk solid samples -- Bulk solid samples include such materials as caulk, soil, and sand. Bulk solid sampling typically include removing a small portion of the potentially contaminated material for analytical testing. For example, a caulk sample would be the quantity of caulk needed by the laboratory for analytical testing, removed directly from the suspect area. Take care to ensure that only the caulk is included in the final sample and not other adjacent materials, such as wood or concrete that may skew the sample analysis results.

When soil or sand samples are collected, you should consider whether the PCBs are on the soil surface or if they could be located deeper in the soil. An example of when PCBs might be on the soil surface would be if fragments of weathered caulking were deposited on undisturbed soil surfaces. Alternatively, PCBs could be located deeper in the soil in locations such as landscaping areas where the soil surface has been disturbed or where new soil has been added.

Porous surface samples -- Because PCBs can migrate into porous surfaces (e.g., brick, masonry, concrete or wood) surface wipe sampling is not adequate to characterize the PCB concentration of porous surfaces. Instead, core samples should be collected on a bulk basis (i.e., mg/kg) to collect the top 0.5 to 2 cm of the porous surface.

For these porous surface samples, an adequate sample (as determined by the analytical laboratory) should be removed for analysis. Tools such as chisels, drills, and saws can be used to collect the sample, taking care to minimize dust generation. The samples should be collected from the top 0.5 to 2 cm of the surface closest to the likely source of PCB contamination.

Non-porous surface samples -- If the surface to be sampled is smooth and impervious (e.g., unpainted metal surfaces), a wipe sample can be collected to determine if the surface is contaminated with PCBs. A standard wipe test, as specified in 40 CFR 761.123, uses a 10 cm by 10 cm (or equivalent that equals100 cm2) template to outline the sample area and a gauze pad or glass wool that has been saturated with hexane to collect the sample. The hexane-saturated wipe is used to thoroughly swab the area inside the 100 cm2 template. Care must be taken to assure proper use of the sampling template, as the sample results will be based on the 100 cm2 sample area (i.e., µg per 100 cm2).

Indoor air samples -- You should collect indoor air samples in accordance with EPA Methods TO-10A (PDF) (37 pp, 288K, about PDF), TO-4A (PDF) (53 pp, 665K, about PDF), or

equivalent. Sufficient sample volumes, as referenced in the EPA Methods, should be collected to prove a minimum laboratory reporting limit of less than 0.1 µg/m3. Consult with your PCB Regional Coordinator for the number of samples to be taken and the type of sampling method to be used.

Sample Documentation

You or your supervisor should maintain a field log book that contains all information pertinent to the site inspection and sampling activities. The person making the entry should sign and date all entries in the log book. Entries into the log book should include the following types of information:

- Site and location of the sample extraction
- Date on each page
- Exact times of sampling events or visual observations
- Types of samples collected and sample identification numbers
- Number of samples collected
- Specific description of sample locations
- Description of sampling methods
- Field observations
- Name of all field personnel

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Steps to Safe PCB Abatement Activities

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This section applies when you are renovating a building where you have tested the air and found PCBs present and plan to abate the PCB-containing materials, or when you are undertaking a PCB-abatement activity.

Are you an abatement contractor working on a project involving a school or other building constructed or remodeled between 1950 and 1980?

If so, it is your responsibility to ensure that the PCB abatement activities are conducted safely and in accordance with EPA and OSHA regulations. This section is designed to help contractors and building owners plan for abatement projects of caulking and other building materials potentially contaminated with PCBs. The work practices discussed in this section are intended to reduce the risk of exposing workers and building occupants to PCBs by making the work area safer during abatement and the building safer for the occupants when the project is complete. Following the suggested work practices will assist you in:

- employing appropriate work practices and protective measures;
- leaving the work area clean and safe for building occupants after completing the job; and
- properly disposing of waste materials.

The following pages describe the necessary steps that you should take to ensure that you are conducting safe removal and abatement activities, and are following appropriate cleanup and disposal measures:

Abatement Step 1: Prepare an Abatement Strategy
Abatement Step 2: Conduct Removal and Abatement Activities
Abatement Step 3: Handling, Storing, and Disposing of Wastes
Abatement Step 4: Prepare and Maintain Documentation

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http://www.epa.gov/pcbsincaulk/guide/guide-sect4a.htm
Last updated on Thursday, December 20, 2012

Polychlorinated Biphenyls (PCBs)

Abatement Step 1: Prepare an Abatement Strategy

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- Introduction
- Facts About PCBs in Caulk
- Steps to Safe Renovation and Repair Activities
- How to Test for PCBs and Characterize Suspect Materials
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- Summary of Tools and Methods for Caulk Removal

Based on the results of the sampling plan, an abatement strategy should be developed. This strategy may require assistance from your Regional PCB Coordinator and state environmental and health agencies.

- Classification of Removed Materials with PCBs
- Abatement Prioritization
- Notifications to EPA May Be Required Prior to Starting a Project

Classification of Removed Materials with PCBs

You will need to determine the type of PCB waste you are removing and then determine your disposal option prior to commencing the abatement activity because you may be required to notify EPA before you begin work. PCB-contaminated caulk is generally considered PCB bulk product waste. If your abatement plan states that you intend to dispose of the PCB caulk and any contaminated building materials together, you may dispose of all the materials as a PCB bulk product waste, even if the PCB caulk becomes separated from the adjacent contaminated building materials during remediation. On the other hand, if you remove the PCB containing caulk and dispose of it separately from the surrounding building material, any PCB contaminated building material is considered a PCB remediation waste. EPA realizes that the PCB caulk may need to be separated during removal from adjacent contaminated building materials due to the presence of other hazardous materials or may accidentally be separated during the removal process.

Please see Current Best Practices for PCBs in Caulk Fact Sheet - Removal and Clean-Up of PCBs in Caulk and PCB-Contaminated Soil and Building Material for a discussion of the classification of removed materials with PCBs.

Descriptions and details on the disposal options are discussed in Abatement Step 3. Some of these procedures have requirements for notification and certification; these are described under "Notifications" below.

Abatement Prioritization

Abatement activities should be prioritized based on the information collected during the building material characterization and classification steps, and based on the following priority drivers:

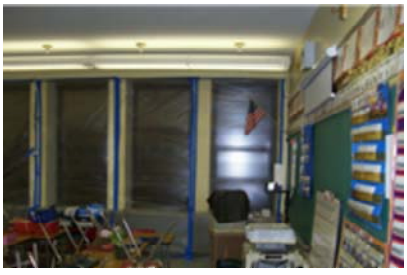
Materials with the highest PCB concentrations should receive a high priority, as they pose the greatest potential for direct exposure

- **PCB Concentrations and Condition --** Materials with the highest PCB concentrations should receive a high priority, as they pose the greatest potential for direct exposure and release of PCBs to indoor air. A release of PCB contaminants into the air, or off-gassing, is especially likely in locations with direct sunlight. Compared to other building materials, caulk will generally have the highest concentrations of PCBs. Caulk with lower concentrations that is not intact and is peeling, brittle, cracking or visibly deteriorating also has a high potential for release of PCBs and also poses a potential to contaminate sand or soil or to be ingested.

and release of PCBs to indoor air.

- **Accessibility --** Materials contaminated with PCBs that are easily accessible by building occupants should receive a higher priority when evaluating the need for removal because of the potential for direct exposure. Note that, in addition to the accessibility of the contaminated material to the abatement workers, the accessibility rating should take into account the potential for building occupants to contact PCB-containing building material directly (dermal or ingestion) or indirectly via the air handling system (inhalation).

- **Occupancy --** PCB-containing materials in locations that have a higher rate of occupancy should receive a higher priority when evaluating the need for removal because of the increased potential for direct exposure. However, consideration should be given to the need for the safe, continued use of portions of the building during removal and clean-up activities. For example, conducting the abatement in phases could allow for partial occupancy of a building. The phasing sequence should consider the physical layout of the building to determine if the removal and clean-up areas and occupied spaces are sufficiently separated.



Interim Measures -- In some cases, interim maintenance measures, such as temporary encapsulation (i.e., covering materials with plastic and securing with duct tape), can reduce or eliminate exposure to PCB-containing building materials until they can be scheduled for abatement. As noted above, PCB-containing caulk typically has the highest PCB concentrations and will be given a higher priority for removal over other building materials. Masonry, wood, brick, and other building materials contaminated with PCBs typically contain lower concentrations of PCBs. Thus, these PCB-contaminated materials typically pose a lower potential for exposure than caulk and should be dealt with accordingly.

Notifications to EPA May Be Required Prior to Starting a Project

Depending on the method you choose for disposal of contaminated wastes and cleanup debris, you may be required to submit documentation to and obtain approval from EPA prior to starting your removal or abatement project. Please see Abatement Step 3 for your disposal options.

The decision on how to manage PCB contaminated substrate may be subject to a variety of site-specific facts. The appropriate EPA regional office and regional PCB coordinator can be consulted as necessary for assistance with making these decisions. For instance, property owners have identified instances where PCB caulk contained high levels of other hazardous constituents such as asbestos. Similarly, there are cases where PCB paint has been found to contain high levels of leachable metals. In these scenarios, care must be taken to fully characterize the waste to determine the appropriate disposal option.

Abatement Plan

An Abatement Plan (including a cleanup plan) should be prepared prior to commencing any actions at a building. The self-implementing procedures for removal or abatement of PCB-contaminated building materials from which PCB caulk has been removed (i.e., PCB remediation waste), require that an Abatement Plan be prepared [40 CFR 761.61(a)(3)(C)] and submitted as part of the notification and certification requirements described in "Notifications and Certifications" below. The plan must include a description of the removal and abatement schedule, disposal technology, and approach. The cleanup approach described in the plan should identify the proposed cleanup levels, removal and abatement procedures, verification sampling procedures, waste storage and handling procedures, and disposal options. The plan also must also contain options and contingencies to be used if unanticipated higher concentrations or wider distributions of PCBs are found, or other obstacles force changes in the cleanup approach.

Notifications and Certifications for Remediation Waste (40 CFR part 761.61(a)(3))

When conducting abatement activities for PCB-contaminated building materials from which PCB caulk has been removed by the self-implementing procedures or risk-based disposal option under 40 CFR part 761.61(c), you must submit the appropriate notifications to the EPA, as described below.

Self-Implementing Procedure -- At least 30 days prior to removal and abatement of building materials contaminated with PCBs using the self-implementing procedure, the person in charge of the cleanup or building owner must notify the following people of the planned action in writing:

- The EPA Regional Administrator
- The Director of the state or tribal environmental protection agency, and
- The Director of the county or local environmental protection agency where the cleanup will be conducted.

Within 30 calendar days of receiving the notification, the EPA Regional Administrator will respond in writing approving of the self-implementing cleanup, disapproving of the self-implementing cleanup, or requiring additional information. If the EPA Regional Administrator does not respond within 30 calendar days of receiving the notice, it may be assumed that the plan is complete and acceptable and the cleanup may proceed according to the submitted plan. Once cleanup is underway, any changes from the notification must be provided to the EPA Regional Administrator in writing no less than 14 calendar days prior to implementation of the change.

Risk-Based Disposal Approval -- To sample, cleanup, or dispose of building materials contaminated with PCBs materials from which PCB caulk has been removed in a manner other than described under 40 CFR part 761.61 (a) you must submit and application to EPA under the risk-based disposal option, an application must be submitted to EPA. Each

application must contain the information described in the notification requirements outlined in 40 CFR part 761.61(a) (3). EPA may request other information necessary to evaluate the application. EPA will issue a written decision on each application for a risk-based method, and will approve an application if EPA finds that the method will not pose an unreasonable risk of injury to health or the environment. It is recommended that you contact your Regional PCB Coordinator to discuss the necessary requirements under the risk-based option.

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Next page: Abatement Step 2: Conduct Removal and Abatement Activities

http://www.epa.gov/pcbsincaulk/guide/guide-sect4b.htm
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Polychlorinated Biphenyls (PCBs)

Abatement Step 2: Conduct Removal and Abatement Activities

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- Facts About PCBs in Caulk
- Steps to Safe Renovation and Repair Activities
- How to Test for PCBs and Characterize Suspect Materials
- Steps to Safe PCB Abatement Activities
- Summary of Tools and Methods for Caulk Removal

The removal and abatement procedures for building materials such as masonry, wood, and bricks that were contaminated with or contain PCBs should be determined based on the building material classification, described in the section on the building characterization and sampling plan. When caulk with PCB concentrations equal to or greater than 50 ppm is removed along with any attached PCB containing building materials, it must all be disposed in accordance with the methods provided in 40 CFR 761.62 and described in Abatement Step 3.

- Factors to Consider when Selecting Appropriate Tools and Methods
- Typical Tools and Methods for Removal Activities
- Protective Measures
- Suggested Work Area Decontamination Methods

The following subsections provide an overview of various tools and methods available for removal and abatement of caulk and related building materials. Generally tools should be selected that minimize dust and heat.

Factors to Consider when Selecting Appropriate Tools and Methods

To select the most appropriate tools, it is important to evaluate the location and accessibility of the caulk. Material properties are an important consideration for choosing the right tool to remove old caulk. Check whether the caulk is hard and brittle (aged and weather-exposed caulks, frequently seen in exterior areas) or elastic and soft (primarily in areas protected from sunlight and weather, and located indoors). Furthermore, the material and condition of the adjoining structures (smooth or rough joint faces) play a role in the selection of tools. The most frequently encountered materials of adjoining structures include concrete, sandstone, bricks, polystyrene (with plaster layer), wood, and metals (e.g., window frames).

The anticipated dust and heat generation plays an important role in selecting the right tools and methods for removal. If your tools or work methods generate high heat (temperatures exceeding 212° F.), there is the risk that the PCBs may be released into the air, and workers or building occupants may breathe in PCB gases. More comprehensive protective measures are necessary for methods that generate moderate to heavy amounts of dust or heat.

More comprehensive protective measures are necessary for methods that generate moderate to heavy amounts of dust or heat.

Typical Tools and Methods for Removal Activities

Manual tools are primarily used for smaller joint lengths or when the joints are difficult to access for structural reasons. The summary of suggested tools and methods page provides a summary of the typical manual tools and methods used for removal activities. Advantages of manual processes compared to electromechanical methods include a lower volume of fine dust, the absence of heat development, and consequently, lower expenditures for personal and environmental protection. Utility knives are particularly suitable for manual processes, provided the caulk is not too hard or brittle. Soft caulk, especially indoors and in external areas without weather or sun exposure, can be quickly and efficiently removed with a utility knife. Hard or brittle caulk is mainly found in exterior areas, especially in places with sun exposure. Hard or brittle caulk may have to be broken or chiseled out with ripping chisels, crowbars, hammers, and chisels. Depending on the condition of the caulk and the surrounding materials, the joint faces can be reworked by shaving and scraping with a putty knife, scraper, or wire brush.

Electromechanical tools have ergonomic advantages over most manual methods. Electromechanical tools are better suited for projects with many joints and semi-soft to hard and brittle caulk. Electrical joint cutters with rotating blades (also known as oscillating knives) have proven especially useful in these situations. Generally, electromechanical procedures generate higher volumes of dust and more heat, which requires more complex protective measures (personal and environmental protection) than manual methods. Some electromechanical tools may have limited applications (e.g., jigsaw) or are unsuitable because they produce significant amounts of dust or high heat. The summary of suggested tools and methods page provides a summary of the typical electromechanical tools and methods used for removal activities.

Typically, joint faces have to be cleaned after the removal of the old caulk to install the new, high-quality caulking. The removal of the caulk containing PCBs should be as complete as possible, with no visible residue remaining. The selection of tools and methods for cleaning/reworking joint faces is primarily based on structural requirements and consideration of protective measures. Additionally, the material properties of the adjoining structures must be taken into account to ensure that the joint faces are not damaged. Tools with beating, striking, or pronounced abrasive effects are not suitable for working on sensitive adjoining structures, such as limestone, plaster-covered insulation, wood, or metal parts.

An effective method to treat joint faces is dry ice blasting, which is primarily reserved for major restoration projects because of the complex protective measures it requires. In the case of smooth, non-porous surfaces such as metal (e.g., unpainted window frames), glass, ceramic materials, or tiles, that are not to be removed and disposed of, the surface should first be cleaned with a rag dipped in solvent (e.g., acetone). When working with solvents, you should observe protective measures such as, the use of solvent-resistant gloves, increased air exchange with sufficient fresh air supply, compliance with workplace limit values, and measures to prevent fire and explosion. In addition, used solvent and/or cleaning rags may be subject to regulation under federal or authorized state hazardous waste regulations.

Data from individual restoration projects have shown that PCBs spread from the caulk into adjoining structures (e.g., brick, wood, or concrete) over time. Consequently, it is highly likely that the material adjoining the PCB-containing caulk at the joint face is contaminated. In many cases of caulk contaminated with PCBs at > 1,000 ppm, several millimeters of the

adjoining concrete contained PCB contamination in a concentration range of several hundred to several thousand parts per million. As previously discussed, the adjoining materials contaminated with PCBs are typically characterized as PCB remediation wastes. PCB bulk product waste must be handled in accordance with 40 CFR part 761.62 while PCB remediation waste must be handled in accordance with 40 CFR part 761.61 while PCB remediation waste must be handled in accordance with 40 CFR part 761.61. Refer to Abatement Step 3 for more information.

Under certain situations, it may be more practical to separate PCB-contaminated parts of the building materials from adjacent PCB-free materials in the area of the joint faces. This can be done with electromechanical tools such as circular saws or slot mills with diamond blades or with maximum pressure blasting methods. In such cases, the material separation should include sufficient safety spacing from the non-contaminated building parts, and suitable measures to contain the dust volume and retain the blasting materials.

Take note that PCB contaminated building materials are considered PCB bulk product waste when the PCB caulk is still attached, while PCB contaminated building materials are considered PCB remediation waste when the PCB caulk has been separated from the building materials and disposed of separately. If your abatement plan states that you intend to dispose of the PCB caulk and any contaminated building materials together and the PCB caulk becomes separated from the adjacent contaminated building materials during remediation, you may still dispose of all the materials as a PCB bulk product waste.

Protective Measures

- Occupational Protective Measures
- Protective Measures for Third Parties and the Environment
- Heating, Ventilating and Air Conditioning (HVAC)
- Communications about the Job and Site Security

The need for protective measures primarily depends on the volume of dust generated by the particular work method. To limit protective measures needed, it is best to select tools and methods that generate the lowest possible dust volume. Protective measures should provide for direct personal protection (workers), protection of building users and third parties (e.g. passers-by), and safeguard the potential for spreading PCB contamination (cross-contamination) to surrounding areas of the abatement project.

An integral step in implementing protective measures is to assign a containment area for each distinct abatement area.

An integral step in implementing protective measures is to assign a containment area for each distinct abatement area. The containment area size and construction should be proportionate to the activities that will be conducted (i.e., amount of dust generation expected). Containment structures should be constructed within the containment area at each location where abatement is performed and in a manner that prevents airborne dust from spreading outside the abatement area. For example, a containment structure can be constructed of poly sheeting draped over existing building features and/or support frames built specifically for the containment area. The containment area should be maintained under negative air pressure by installing an induced draft fan equipped with High Efficiency Particulate Air (HEPA) filters to prevent dust particles from being carried out of the containment area. The filtered exhaust from the fan should be routed outside the containment area and vented outside of the building. When significant

dust may be produced by the abatement activities, dust monitoring outside the containment structures may be warranted.

Dust aspiration techniques can be used to reduce the amount of dust created from tools/methods that can generate higher dust volumes, such as grinders, cutters, saws, and slot mills as identified on the summary of suggested tools and methods page. These techniques are efficient methods for reducing the amount of dust that can spread through the containment area, and can significantly reduce the amount of dust in the breathing zone of the worker using the tool. Affixing a dust collector nozzle (connected to an industrial vacuum with HEPA filters) to the working end of the electromechanical tool is an example of a dust aspiration technique. The figure below illustrates examples of dust aspiration techniques.

Source: Rex, G.B., www.pcbinschools.org, accessed July 2009.

Examples of Dust Aspiration Techniques at the Point of Generation

Occupational Protective Measures -- his section discusses measures for protecting workers from exposure to PCB gases and dust. Depending on the selection of tools, PCB gases and dust are likely to be released to air when working on an abatement project. Therefore, workers should use suitable protective measures (personal protection gear) when working with dust-generating methods or tools. These protection measures should prevent PCBs from getting into the body through inhalation, ingestion, and/or by absorption through exposed skin.

The following protective measures are generally applicable, and should be considered when handling materials containing PCBs:

- **Gloves and skin protection --** Chemical-resistant gloves and Tyvec coveralls are the standard personal protective equipment (PPE). Chemical-resistant gloves made of nitrile butadiene rubber (NBR) are particularly protective. Pay particular attention to the type of gloves and how long gloves can be used when working with solvents (e.g. for cleaning non-porous surfaces). Only certain gloves are suitable for working with particular solvents, and how long gloves can be used with that solvent (breakthrough time) differs.

- **Eye protection --** All workers should wear safety glasses or protective goggles for all removal, abatement, and sampling activities.

- **Respiratory protection --** Consider using an air-purifying respirator (OSHA/NIOSH approved) with combination organic vapor and HEPA cartridges when working with dust generating activities or solvents.

- **Worker hygiene --** Eating, drinking, and smoking should be prohibited in the work site. For work involving dust generation, showers and separate changing cabins for work clothing and everyday clothing should be provided.

Read about OSHA standards for personal protective equipment.

Protective Measures for Third Parties and the Environment -- To protect third parties and the environment during abatement projects, it is important to prevent PCB-contaminated dust from contaminating the immediate surroundings (i.e. adjoining rooms for interior projects and directly adjoining areas of exterior projects). PCBs can stay in the environment for long periods of time, and can be a source of exposure to building occupants. Consider the following protective measures for third parties and the environment when handling materials containing PCBs:

To protect third parties and the environment during abatement projects, it is important to prevent PCB-contaminated dust from contaminating the immediate surroundings.

- Adequately construct a containment area to minimize the spread of PCB dust to other surrounding areas and to make sure proper control requirements are followed (i.e., removal of used PPE prior to exiting the control area).
- Properly store removed PCB-contaminated materials, directly at the place of removal. Materials should be placed in tightly-locking, stable containers, for example fiber drums or polyethylene buckets with polyethylene lining.
- Regularly clean the work area, including tools and machinery, with an industrial vacuum and HEPA filter and/or mopping to remove particles.
- Properly dispose of contaminated protective clothing (gloves and protective suits), filters of aspiration devices, and cleaning aids in the containment area.

In addition to these generally applicable protective measures, consider conducting air sampling in the vicinity of the containment area to assess whether PCB-contaminated dust is escaping the containment area and impacting nearby clean areas. The air sampling should be conducted the procedures discussed in the section on testing and characterizing suspect materials. When determining if air sampling should be conducted during abatement activities, consider the following:

- amount of dust generated by the activities
- location of abatement activities
- duration of dust-generating activities
- size of the area being remediated
- concentration of PCBs in the material being remediated
- effectiveness of the containment area structure

Heating, Ventilating and Air Conditioning (HVAC) -- The HVAC system should be shut down and remain off until PCB abatement is complete. If this is not possible, isolation of the abatement area from the HVAC system should be implemented. During the preliminary assessment of the extent of PCB contamination, sampling should be conducted in all areas/rooms/units serviced by the HVAC system to determine the spread of contamination, and sampling results should be noted in the cleanup plan.

Hire contractors who specialize in cleaning ventilation systems to clean HVAC systems. These contractors have specialized tools and training to ensure thorough cleanup. It is important to remember that not all ventilation system ducts can be cleaned. For example, some ducts are lined with fiberglass or other insulation (which, if damaged during cleaning, can release fiberglass into living areas). Also, flexible ductwork frequently has a porous inner surface and, in most cases, cannot be economically cleaned. For this reason, the ductwork should be discarded and replaced after the ventilation system is cleaned.

If it is determined that the HVAC system can be cleaned, it should be cleaned early in the abatement process. Once cleaned, the HVAC system should be sealed at all openings to prevent potential recontamination. At a minimum, when approaching a ventilation system constructed of non-porous materials, ventilation contractors should:

- Perform a walk-through of the structure to establish a specific plan for decontamination of the ventilation system.
- Follow safety and health procedures, in accordance with OSHA regulations and guidelines and other applicable state or local worker safety and health regulations, to protect workers and others in the vicinity of the structure during the decontamination process.

Communications About the Job and Site Security -- Clear communication with all affected groups (e.g., building occupants, workers, building owners, and community members) is necessary to create a safe working environment. Site security measures should also be implemented to prevent unauthorized access to the containment areas. Read about specific security measures and suggested notification.

Suggested Work Area Decontamination Methods

Following the abatement activity and break down of the containment area, the entire area should be vacuumed with an industrial HEPA vacuum and wiped with wet rags to remove any dust from surfaces within the area. All wastes collected or created (e.g., used rags) should be placed in a container or wrapped in plastic, and transported to the disposal storage area. Then, conduct a visual inspection of the decontaminated area to determine if additional decontamination is warranted (i.e., if the area is still dusty). The HEPA vacuum should also be decontaminated or disposed of.

After the decontamination is considered complete, collect wipe samples from surfaces within the subject area. Collect a sufficient number of wipe samples within the subject area to ensure that the area was fully decontaminated. The number and location of samples should be determined in accordance with 40 CFR 761 Subpart O (bulk wastes and porous surfaces) or Subpart P (non-porous surfaces), with a minimum of three samples collected from each type of Bulk PCB Remediation Wastes. You should collect samples from horizontal surfaces where dust is most likely to accumulate.

The subject area is considered sufficiently decontaminated if conducted in accordance with 40 CFR 761.79. If the standard of 10µg/100 cm2 is not met for all of the wipe samples, additional decontamination procedures must be performed within the entire subject area and additional wipe samples must be collected. These procedures will be repeated until the 10µg/100 cm2 standard has been achieved.

Previous page: Abatement Step 1: Prepare an Abatement Strategy

Next page: Abatement Step 3: Handling, Storing, and Disposing of Wastes

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Polychlorinated Biphenyls (PCBs)

Abatement Step 3: Handling, Storing, and Disposing of Wastes

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After removal and breakdown of materials within the containment area, all materials to be disposed of should be contained (e.g., wrapped in poly sheeting or placed in a drum) and immediately transported to a designated storage area. Disposal methods are determined based on the regulatory material classification, as previously discussed in Abatement Step 1. All applicable provisions for storing, packaging, transporting, manifesting, recordkeeping and disposing in the PCB regulations must be adhered to.

- How Do I Dispose of My PCB-Containing Caulk?
- How Do I Dispose of My Other PCB-Contaminated Building Materials?
- How Do I Dispose of My Cleanup Debris?
- Disposal Facilities

How Do I Dispose of My PCB-Containing Caulk and Attached Building Materials??

The disposal of PCB-containing caulk and any attached PCB-containing building materials is regulated under 40 CFR 761.62. . (Note: If your abatement plan states that you intend to dispose of the PCB caulk and any contaminated building materials together and the PCB caulk becomes separated from the adjacent contaminated building materials during remediation, you may still dispose of all the materials as a PCB bulk product waste.) Under this provision, the removed caulk and building materials must be disposed of using one of the following four methods for this type of material (PCB Bulk Product Waste):

- **Performance-based disposal**. The performance-based option allows for disposal of PCB bulk product waste in a TSCA incinerator; a TSCA chemical waste landfill; a RCRA hazardous waste landfill; under a TSCA approved alternate disposal method; under the TSCA regulated decontamination procedures; or in a facility with a coordinated approval issued under TSCA. Disposal under this option does not require you to obtain approval from EPA.

- **Disposal in solid waste landfills**. PCB bulk product waste may be disposed of in non-hazardous waste landfills as permitted by states. Disposal under this option does not require you to obtain approval from EPA. However, EPA recommends that you check state regulations which may prohibit or limit disposal of PCB bulk product waste in solid waste landfills. EPA also recommends that you determine prior to shipment that the landfill is willing and able to accept the PCB waste. Anyone sending PCB bulk product waste to a non-hazardous waste landfill permitted by a state must send

written notice to the landfill prior to shipment of the waste stating that the waste contains PCBs at greater than 50 ppm (see 40 CFR 761.62(b)(4)(ii)). This guidance document does not replace or supersede any (sampling) requirements that the receiving facility may deem necessary to determine acceptance of the waste into its facility. Additionally, this guidance does not supersede state requirements which may be more stringent than those mandated by the federal government for management of this debris

- **Risk-based option**. The risk-based option allows for a site-specific evaluation of whether PCB bulk product waste may be disposed of in a manner other than under the performance based disposal option or the solid waste disposal landfill option. Disposal of PCB bulk product waste under this option requires you to obtain approval from EPA, and requires you to demonstrate that the disposal will not present an unreasonable risk of injury to health or the environment.

- **Disposal as daily landfill cover or road bed.** (40 CFR 761.62(d))

NOTES: Re-sampling of caulk waste is not necessary for a Performance-based disposal, disposal in a solid waste landfill or disposal as a daily landfill cover or road bed but may be necessary when implementing the Risk-based disposal option. However, sampling methods described in 761.62 were not designed for waste caulk material. Consult your Regional PCB Coordinator for alternative methods if you select this disposal option.

If PCB Caulk has been Removed, How Do I Dispose Remaining PCB-Contaminated Building Materials?

The disposal of masonry, wood, bricks, and other building materials contaminated with PCBs from which PCB caulk has been removed and is disposed of separately from the surrounding building material is regulated under 40 CFR 761.61. There are three options for management of these types of materials (PCB Remediation Wastes):

- **Self-implementing cleanup and disposal**. The self-implementing option links determining cleanup levels with the expected occupancy rates of the area or building where the contaminated materials are present. The disposal requirements for the self-implementing option vary based on the type of contaminated material and concentration of PCBs in the materials, among other things. Contact your PCB Regional coordinator if you elect to use this disposal option.

- **Performance-based disposal**. The performance-based option allows for disposal or decontamination of the contaminated materials in a TSCA chemical waste landfill; a TSCA incinerator; through a TSCA approved alternate disposal method; under the TSCA regulation's decontamination procedures; or in a facility with a coordinated approval issued under TSCA. Disposal under this option does not require you to obtain an approval from EPA.

- **Risk-based cleanup and disposal**. The risk-based option allows for a site-specific evaluation of whether the PCB-contaminated building materials may be cleaned up or disposed of in a manner other than the alternatives provided under the self-implementing or the performance based disposal options. Disposal of these materials under this option requires you to obtain approval from EPA and demonstrate that the disposal will not present an unreasonable risk of injury to health or the environment.

How Do I Dispose of My Cleanup Debris?

Wastes generated during the cleanup activities previously described in the section, "Leave the Work Area Clean" must also be properly disposed of. Non-liquid cleaning materials and PPE waste at any concentration, including rags, mops, gloves, Tyvec suits, and similar materials resulting from cleanup activities must be disposed of in an appropriate waste facility (state municipal solid waste, state non-municipal non-hazardous waste, federal hazardous waste landfill, or a federally approved PCB disposal facility -- see 761.61(a)(5)(v)). Waste water produced during the job from mopping, wet cleaning, or misting may be regulated for disposal. If you know the concentration of PCBs in waste water, follow the decontamination procedures for water at 40 CFR part 761.61(a)(4)(iv). Otherwise, assume the waste water to be regulated and dispose of the water in a TSCA approved facility (40 CFR part 761.61(b)(1)).

Disposal Facilities

See a listing of TSCA approved disposal facilities.

To find a solid waste disposal facility that will accept PCB-containing caulk, please contact your state environmental agency.

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Next page: Abatement Step 4: Prepare and Maintain Documentation

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Polychlorinated Biphenyls (PCBs)

Abatement Step 4: Prepare and Maintain Documentation

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- Facts About PCBs in Caulk
- Steps to Safe Renovation and Repair Activities
- How to Test for PCBs and Characterize Suspect Materials
- Steps to Safe PCB Abatement Activities
- Summary of Tools and Methods for Caulk Removal

The contractor should perform documentation of the field activities on a daily basis during the abatement project. Following completion of the remedial action, the contractor should prepare an abatement report. The following subsections describe the documentation that should be completed during the project:

- Field Notes
- Photographs
- Transport and Treatment/Disposal Certifications
- Abatement Report
- Where Can I Get More Information about PCBs in Caulk

Field Notes

A daily log of on-site activities should be maintained and may include such items as:

- Daily health and safety meetings
- Personnel and equipment on site
- Field procedures and observations
- Removal, abatement, containment, and decontamination progress
- Sample locations with selection criteria, samples collected, analyses performed, and sample handling
- Telephone or other instructions
- Health and safety issues
- Health and safety monitoring data, including dust monitoring outside containments
- Estimate of wastes generated and stored
- Waste transporter information

Photographs

Daily photographs should be taken of representative activities, such as removal and abatement work, containment structures, decontamination, sampling, and waste handling and storage. Copies of selected photographs with appropriate captions should be included in the abatement report.

Transport and Treatment/Disposal Certifications

Manifests and/or bills of lading for the transportation, treatment, and disposal of regulated waste materials and certifications of the treatment of the wastes, if necessary, must be obtained from the transporter and from the treatment/disposal facility. Copies of these forms must be included in the abatement report, and records must be maintained in accordance

with the requirements as specified in 40 CFR 761 Subpart K (PCB Waste Disposal Records and Reports).

Abatement Report

An abatement report should be prepared upon completion of all remedial activities and include the following information:/p>

- Site description
- A description of field procedures
- Confirmation of sample locations and analytical results for all characterization and verification samples collected.
- A photographic record of the removal and abatement, containment structures, and decontamination
- Dust monitoring data
- Waste transport and treatment disposal information
- Copies of waste manifests and bills of lading

The abatement report and accompanying backup information must be kept on file for a period of three to five years from the date that the abatement activities were completed, as described below:

- Five years for Bulk PCB Remediation Wastes cleaned up and disposed of according to the self-implementing procedures of 40 CFR 761.61(a).
- Three years for PCB Bulk Product Wastes removed and disposed of in a solid waste landfill according to the provisions of 40 CFR 761.62(b).

Where can I Get More Information about PCBs in Caulk?

For more information on how to properly test for and address PCBs in caulk, contact the Regional PCB Coordinator for your state.

In addition, see EPA's PCBs in Caulk Web page.

Previous page: Abatement Step 3: Handling, Storing, and Disposing of Wastes

Next page: Summary of Tools and Methods for Caulk Removal

http://www.epa.gov/pcbsincaulk/guide/guide-appendix.htm
Last updated on Friday, November 30, 2012

Polychlorinated Biphenyls (PCBs)

Summary of Tools and Methods for Caulk Removal

TOOLS/METHOD	SUITABILITY	ADVANTAGES/DISADVANTAGES	PROTECTIVE MEASURES TO CONSIDER
Mechanical Tools			
Utility knife	• Universally applicable tool, especially for cutting out elastic and soft caulk together with an electrical joint cutter> • Suitable for all smooth joint faces • Less suitable for working on projects with caulk of lengths exceeding 100 m • Less suitable for very hard caulk • Choice of different blades to suit the joint width and depth	*Advantages:* • Short, sturdy blade that is easily exchangeable • Handy, low weight • No dust development in case of elastic caulk • Little dust when removing slightly brittle caulk and cleaning joint faces • Gentle treatment of joint faces *Disadvantages:* • Requires great exertion in case of hard caulk • Relative low output (linear meters of caulk/hour) • Relatively high labor costs	• General personal protective measures • Construction of a Containment Area enclosure (if dust is generated) • Work area decontamination
Ripping chisel	• Suitable for breaking out or chiseling hard caulk, especially when working with joint in concave, angled planes • Less suitable for joints	*Advantages:* • Removal of hard and brittle caulk: The cutting edge can be moved along the joint face with greater pressure than a utility knife • Low dust development in case of rough joint faces *Disadvantages:* • Quickly dulls when working with rough joint faces made of concrete or other hard materials	• General personal protective measures • Construction of a Containment Area enclosure • Dust aspiration at the source when cleaning joint faces as described in

	with a width of less than 5 mm • Less suitable for working on projects with caulk of lengths exceeding 100 m	• Possible damage to adjoining structural parts	Abatement Step 2.
Putty knife/scrapper	• Suitable for reworking joint faces with shaving or scraping • Suitable for removing loose or crumbling caulk	*Advantages:* • Suitable for rough joint faces *Disadvantages:* • Poor cutting action • Small particle debris at the joint faces • Longer joints and hard caulk	• General personal protective measures • Construction of a Containment Area enclosure • Dust aspiration at the source when removing loose or crumbling caulk as described in Abatement Step 2.
Bush hammer	• Suitable for hammering away hard or well-attached caulk residue on hard, robust areas	*Advantages:* • No heavy dust development *Disadvantages:* • Limited to hard and solid surfaces	• General personal protective measures • Construction of a Containment Area enclosure • Dust aspiration at the source when removing loose or crumbling caulk as described in Abatement Step 2.
Hammer and chisel	• Suitable for very hard, brittle, or wide joints > 2 cm	*Advantages* • For very hard caulk *Disadvantages* • Possible damage to structural parts	• General personal protective measures • Construction of a Containment Area enclosure • Dust aspiration at the source when removing loose or crumbling caulk as described in Abatement Step 2.
Electromechanical Tools			
		Advantages:	

Electrical joint cutter with oscillating blade	• Universally applicable tool for cutting out hard and soft caulk, especially in combination with a utility knife; suitable for all material types of adjoining structures • Less suitable for removing caulk that is difficult to access • Not suitable for very hard caulk	• Short, sturdy blade that is easily exchangeable • Handy, acceptable weight • Low dust volume • Typically low risk of damage to joint faces with careful work *Disadvantages:* • Moderate exertion required; • No integrated dust aspiration	• General personal protective measures • Construction of a Containment Area enclosure • Maintain negative air pressure with induced draft fan equipped with High Efficiency Particulate Air (HEPA) filters • Dust aspiration at source when removing loose or crumbling caulk as described in Abatement Step 2.
Electrical scraper with exchangeable blades	• Universally applicable tool for soft to hard caulk, especially in combination with a utility knife; • Suitable for difficult-to-access joint areas in corners and along edges • Also suitable for reworking joint faces • Not suitable for very hard caulk	*Advantages:* • Lightweight device, handy • Low exertion • Low dust volume *Disadvantages:* • No integrated dust aspiration	• General personal protective measures • Construction of a Containment Area enclosure • Maintain negative air pressure with induced draft fan equipped with HEPA filters • Dust aspiration at source when cleaning joint faces as described in Abatement Step 2.
Needle hammer	• On level areas: for broad, shallow dummy joints and connection joints	*Advantages:* • Removal of firmly attached, hard caulk *Disadvantages:* • Higher dust volume; possible damage to adjoining structures	• General personal protective measures • Construction of a Containment Area enclosure • Maintain negative air pressure with induced draft fan equipped with HEPA filters • Dust aspiration at source when

			cleaning joint faces as described in Abatement Step 2.
Jigsaw with exchangeable saw blades	• Tool with integrated dust aspiration. Use is limited to deep joints with free space in accordance with blade length • Only suitable for cutting out the caulk • Not suitable for reworking joint faces • Not suitable for difficult-to-access joint areas in corners and along edges	*Advantages:* • Good cutting rate for semi-soft and hard caulk • Integrated dust aspiration *Disadvantages:* • Only suitable for joints in vertical planes with open joint backup	• General personal protective measures • Construction of a Containment Area enclosure • Maintain negative air pressure with induced draft fan equipped with HEPA filters • Connection of the integrated dust aspiration device to an industrial vacuum with HEPA filters.
Diamond sanding device	• Electrical joint cutter with oscillating, diamond-coated cleaning blade and integrated dust aspiration • Only suitable for cleaning joint faces	*Advantages:* • Low dust volume compared to angle grinder • Integrated dust aspiration *Disadvantages:* • Heat development and gaseous emission production not clarified	• General personal protective measures • Construction of a Containment Area enclosure • Maintain negative air pressure with induced draft fan equipped with HEPA filters • Connection of the integrated dust aspiration device to an industrial vacuum with HEPA filters.
Rotary cutting tools	• Only suitable for cutting out the caulk • Not suitable for reworking joint faces • Suitable for difficult-to-access joint	*Advantages:* • Lightweight device, handy • Low exertion • Typically low risk of damage to joint faces with careful work *Disadvantages:* • Higher dust volume • No integrated dust aspiration	• General personal protective measures • Construction of a Containment Area enclosure • Maintain negative air pressure with

	areas along edges; not suitable for accessing corners		induced draft fan equipped with HEPA filters • Dust aspiration at source when cleaning joint faces as described in Abatement Step 2.
Chemical-Physical Methods			
Dry ice (CO2) blasting	• Suitable for gentle reworking of joint faces • Suitable for large joint lengths	*Advantages:* • Gentle on the surrounding materials • Good cleaning performance (Note: In some cases, the method cannot completely remove caulk) • Good performance for large joint lengths *Disadvantages:* • Expensive (especially in combination with high demands for protective measures) • Complex requirements for protective measures	• Enclosure of the work area with airtight seal, negative pressure and controlled air exchange, dust aspiration at the source • Full respirator with fresh air supply and protective suit • Noise and ear protection (noise levels range from 85 to 120 dBA, depending on the device)

Previous page: Steps to Safe PCB Abatement Activities