

PCBs in Building Materials

Determining the Presence of Manufactured PCB Products in Buildings or Other Structures



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Manufactured PCB products are materials that were made with PCBs and are in a non-liquid state as defined in 40 CFR § 761.3.¹ The use of manufactured PCB products containing PCBs at greater than or equal to ($\geq$) 50 parts per million (ppm) is not authorized under TSCA and the federal PCB regulations at 40 CFR part 761.² If manufactured PCB products containing PCBs $\geq$ 50 ppm are found in a building or other structure, they must be removed and disposed of as PCB bulk product waste in accordance with 40 CFR § 761.62. The purpose of this fact sheet is to provide a resource to assist property owners or operators in determining if manufactured PCB products may be present in a building or structure.

EPA believes there was widespread use of manufactured PCB products during construction and renovation activities occurring primarily between about 1950 and 1979. Nationally, Environmental Health and Engineering, Inc. (2010) estimates that 60% of the U.S. building stock may be affected by manufactured PCB products.³ A compilation of data on PCBs in caulking sealants by Kohler, et al. (2005) identifies a 48% frequency of detection with median PCB concentrations in the 1,000 to 10,000 ppm range.⁴ One article estimated that up to 25,290 school buildings may have been constructed between 1950 and 1980, when the greatest use of manufactured PCB products occurred.⁵ Studies of commercial buildings indicate similar findings.^{6, 7, 8}

EPA recommends that property owners or operators planning demolition or renovation of a building or structure determine if manufactured PCB products are present and, if so, properly remove and dispose of them during these activities. If property owners or operators, such as school authorities, are not planning renovation or demolition and have concerns that manufactured PCB products may be present in a building or structure they may wish to consider determining the presence of manufactured PCB products; however, before testing materials, EPA recommends they first consult and take the actions outlined in EPA's guidance for school administrators and building owners, which includes information about managing PCBs in building materials to help minimize possible exposures to building occupants.

Disclaimer: The recommendations in this document do not impose legally binding requirements and will not be implemented as binding in practice. They do not impose any obligations on private parties nor are they intended to direct the activities of any other federal, state, or local agency or to limit the exercise of their legal authority.

Polychlorinated Biphenyls (PCBs)

PCBs were domestically manufactured from 1929 until fabrication was banned in 1979 by the Toxic Substances Control Act (TSCA), with some products and processes excluded from the ban by regulation. PCBs were used extensively as coolants in hydraulic systems and as dielectric fluids in electrical equipment as well as many other applications. However, PCBs may still be present in products and materials produced before 1979 (including oil used in motors and hydraulic systems) or in excluded manufacturing processes, as defined in 40 CFR 761.3, and can still be released into the environment, where they do not readily break down. PCBs have been identified as probable human carcinogens and cause a variety of non-cancer health effects as well.¹⁰

Identification of Potential Manufactured PCB Products

Manufactured PCB products may be found throughout a building or on a structure. Manufactured PCB products that contain ≥ 50 ppm PCBs have been frequently identified in and around window and door frames, in sealants and coatings on surfaces, and within expansion joints. There may be an increased likelihood of finding manufactured PCB products within areas designated for certain types of uses, such as in areas or rooms subject to high heat or fire such as boiler rooms. The PCB concentration in these materials can vary widely. EPA is aware of PCB concentrations in caulk up to 500,000 ppm or 50% by weight.

Listed below are potential types of manufactured PCB products that may be present in buildings or on structures:⁹

- Paint, varnishes, and lacquers
- Non-conducting materials in electrical cables (e.g., plastic and rubber)
- Rubber and felt gaskets
- Coal-tar enamel coatings (e.g., pipe coating) and rust inhibitor coatings
- Insulation materials (e.g., fiberglass, felt, foam, and cork)
- Adhesives and tapes
- Caulk, grout, and joint material (e.g., putty, silicon, and bitumen)
- Pipe hangers
- Plastic applications, including vinyl and PVC
- Galbestos siding
- Mastics
- Acoustic ceiling and floor tiles
- Asphalt roofing and tar paper
- Synthetic resins and floor varnish
- Sprayed-on fireproofing

Considerations for Determining the Presence of Manufactured PCB Products in Buildings or Other Structures

There is no visual standard for determining if manufactured PCB products are present in a building or structure. To determine if such products are present, sampling and laboratory analysis for PCBs are necessary. A property owner or operator may wish to consider the following steps in deciding whether to conduct testing and develop a testing program.

- Evaluating PCB Exposure – Testing of indoor air and/or wipe sampling may be a first step to determine the potential for exposure of PCBs to building occupants.
- Reviewing Building Records – Building materials manufactured or installed primarily between about 1950 and 1979 have a greater likelihood to contain PCBs. For buildings constructed or renovated primarily between about 1950 and 1979 and which may have been renovated after 1979 (such as window replacement and installation of new caulk), PCBs may still be present in the building materials and may even have migrated from substrates (e.g., brick) previously contaminated by manufactured PCB products into the newly installed replacement materials. EPA recommends that the property owner or operator review historical records related to the construction, renovation, and maintenance of the building or structure. Historical records can help identify materials, areas, or parts of the building that either may contain or are unlikely to contain PCBs.

- **Compiling Inventory** – In cases where the property owner or operator may not have definitive records that indicate the presence or absence of manufactured PCB products, EPA recommends developing an inventory of each material type that the owner or operator believes may contain PCBs. When compiling an inventory of potentially suspect manufactured PCB products, EPA recommends considering variance within a material type. For example, a building may contain various colors of paint or types of caulk that may contain PCBs within different areas or different floors or elevations of the building. The inventory should include the number of individual material types present (e.g., number of gaskets) or the square or linear feet of each material type (e.g., grey caulk, white caulk). EPA recommends performing an inspection of the building to look for suspect manufactured PCB products but notes that relying solely on a visual assessment of materials is insufficient to determine the presence of PCBs.
- **Testing** – Based on the information gained in the record review and inventory, a property owner or operator may choose to test the inventoried materials or may assume the suspect manufactured PCB products contain PCBs ≥ 50 ppm.
- **Sampling Plan** – Before any testing occurs, EPA recommends developing a building material sampling plan that reflects the current and future use plan for the building and the project remediation goals.
- For additional information refer to the links below.
 - [*PCBs in Building Materials*](#)
 - [*Standard Operating Procedure for Sampling Porous Surfaces for PCBs*](#)
 - [*Exposure Levels for Evaluating PCBs in Indoor School Air*](#)
 - [*How to Test for PCBs and Characterize Suspect Materials*](#)

Renovation for Continued Use

- Manufactured PCB products that contain PCBs ≥ 50 ppm are unauthorized for use and must be removed for disposal as a PCB bulk product waste (see 40 CFR §§ 761.3, 761.20(a), and 761.62).
- EPA recommends testing if a property owner or operator plans to renovate a building or other structure for continued use when there are no clear records to conclude that the building or structure is unlikely to contain manufactured PCB products. The results of this testing will help ensure that renovation workers and building occupants are protected, contaminated materials are properly disposed, and adequate controls are put in place to prevent a release of PCBs to the environment. EPA recommends testing all suspect manufactured PCB products. Testing could help facilitate segregation and recycling of building materials not contaminated with PCBs provided other contaminants, such as asbestos and lead-based paint, are not present.
- As an alternative to testing, the property owner or operator could choose to assume that untested suspect manufactured PCB products contain ≥ 50 ppm and are regulated for PCB disposal under 40 CFR § 761.62.
- The property owner or operator should determine if surrounding porous substrate materials, such as concrete or brick, or non-porous substrate materials, such as metal window frames, contain PCBs at regulated concentrations¹¹ prior to removal of manufactured PCB products.
- EPA recommends that the property owner or operator outline areas where manufactured PCB products are found and prioritize removal of those products along with any contaminated substrate materials based on considerations such as their PCB concentrations, potential accessibility and exposure, and building occupancy.

- The property owner or operator should determine if indoor air and/or wipe testing prior to and/or after abatement is warranted. This may be necessary to address concerns about building occupant exposure via the inhalation pathway based on building construction details and features, cleaning practices, or the location of the identified manufactured PCB products.
- If removal of the manufactured PCB products cannot happen in the short term, the property owner or operator should work with the [EPA Regional PCB Coordinator](#) to develop an interim plan. This plan should include measures to protect building occupants and to manage the manufactured PCB products until they can be removed and disposed of as PCB bulk product waste in accordance with 40 CFR § 761.62, and any surrounding PCB-contaminated substrate materials can be removed and disposed of as either PCB bulk product waste or PCB remediation waste or decontaminated in accordance with 40 CFR §§ 761.61, 761.62, or 761.79. The decision to designate manufactured PCB products and associated PCB-contaminated substrates as PCB bulk product waste should be documented at the time of designation for disposal. See EPA's [Polychlorinated Biphenyl \(PCB\) Guidance Reinterpretation](#) for more information. To support such an interim plan, the extent of PCB contamination must be identified, and interim measures, including indoor air and wipe sampling, may be required until the manufactured PCB products and adjacent substrates are removed (see 40 CFR §§ 761.61, 761.62, and 761.79).
- For additional information, refer to the links below.
 - [Steps to Safe PCB Abatement Activities](#)
 - [Steps to Safe Renovation and Repair Activities](#)
 - [Practical Actions for Reducing Exposure to PCBs in Schools and Other Buildings](#)

Demolition and Disposal

- PCB concentrations in the manufactured PCB products determine whether and how a PCB waste is regulated for disposal. Prior to demolition, a property owner or operator could choose to assume that the untested suspect manufactured PCB products are regulated for disposal under 40 CFR part 761 or, alternatively, could test suspect manufactured PCB products in the building or structure to determine if PCBs are present.
- If testing is conducted and the products are found to contain ≥ 50 ppm PCBs, or if the products are assumed to be regulated for disposal, they must be disposed of as a PCB bulk product waste (see 40 CFR §§ 761.3 and 761.62).
- If manufactured PCB products are assumed or verified to contain PCBs ≥ 50 ppm, the property owner or operator should consider whether adjacent building substrate in contact with the manufactured PCB products is regulated for cleanup and disposal as a PCB remediation waste under 40 CFR § 761.61, depending upon the PCB concentration present.¹¹ The property owner or operator could choose to assume PCBs are present or choose to test the substrate to determine if PCBs are present. PCB-contaminated substrate may be regulated for disposal as PCB remediation waste under 40 CFR § 761.61 or managed as PCB bulk product waste, as described below.
- If manufactured PCB products are present, EPA recommends that the property owner or operator evaluate removal of those products and any PCB-contaminated substrates (e.g., concrete, brick, metal) for disposal at an appropriate facility before demolition. Testing could help facilitate segregation and recycling of substrates not contaminated with PCBs provided other contaminants, such as asbestos and lead-based paint, are not present. If contaminated, adjacent substrates, or portions of adjacent substrates (such as the concrete edge around a window), may be managed as

PCB bulk product waste and disposed of together with the manufactured PCB products if they are designated as such prior to removal of the manufactured PCB products. See the Handling, Storing, and Disposing of PCB Wastes section below and EPA's [Polychlorinated Biphenyl \(PCB\) Guidance Reinterpretation](#) for more information.

- For additional recommendations on demolition of buildings with PCBs, see also: [Best Practices for Reducing, Reusing, and Recycling Construction and Demolition Materials - Environmental Considerations](#).

Outdoor Contamination Concerns

- Property owners and operators should be aware of the potential for ground surfaces surrounding buildings to become contaminated with PCBs originating from manufactured PCB products, particularly from exterior paints, caulks, and sealants. Ground surfaces include not only soil, but other solid surfaces such as asphalt and concrete.
- Stormwater and surface water runoff may transport PCBs to storm water drains and sewers or nearby surface water features. Controls to prevent potential releases of PCBs and protect stormwater and surface water conveyances are recommended and may be required if the activity is permitted under the Clean Water Act, such as under the [Construction General Permit \(CGP\)](#). See discussion of Parts 1.2.2 and 3.2 of the CGP in the [CGP Fact Sheet](#) for recommended controls and best management practices. It is also important to consider dust control and monitoring during demolition projects to protect third parties and the environment during demolition projects. See EPA's website on [Managing Stormwater and Dust at Demolition Sites](#).
- Property owners or operators should consider sampling nearby ground surfaces (e.g., soil, asphalt, concrete) and areas of runoff pathways including drainage swales and catch basins to determine if exterior manufactured PCB products have impacted those surfaces.

Handling, Storing, and Disposing of PCB Wastes

- **Storage of PCB remediation waste and PCB bulk product waste** is subject to the applicable requirements of 40 CFR § 761.65, which includes storage area design requirements and storage time limits.
- **Disposal of PCB bulk product waste** is subject to the requirements of 40 CFR § 761.62, which includes disposal in a TSCA Chemical Waste Disposal facility, RCRA Hazardous Waste Disposal facility, or Solid Waste Landfill disposal (for specified materials).
- **Disposal of PCB-contaminated substrates** that meet the definition of a PCB remediation waste as defined under 40 CFR § 761.3:
 - If the manufactured PCB products are no longer present or are no longer attached to the adjacent substrate at the time of designation for disposal, the PCB-contaminated substrate must be disposed of as a PCB remediation waste (see 40 CFR § 761.61). 40 CFR § 761.61 allows disposal in a TSCA Chemical Waste Disposal facility. Disposal in a RCRA Hazardous Waste Disposal facility or Solid Waste Landfill (for < 50 ppm materials) is subject to notification requirements of 40 CFR §§ 761.61(a) or (c).
 - If the property owner or operator intends to remove and dispose of the manufactured PCB products and any associated PCB-contaminated building substrates at the same time, these

combined wastes may be disposed of as a PCB bulk product waste in accordance with 40 CFR § 761.62 without further testing of the building substrate even if the manufactured PCB products become separated from the adjacent building substrate during removal. However, substrate testing may be necessary to determine the extent of contamination into or on the substrate. The decision to designate manufactured PCB products and associated PCB-contaminated substrates as PCB bulk product waste should be documented at the time of designation for disposal (e.g., within the demolition plan). See EPA's [Polychlorinated Biphenyl \(PCB\) Guidance Reinterpretation](#) for more information.

- **Notification of PCB Waste Activity.** Any company or person storing, transporting, or disposing of PCBs or conducting PCB research and development must notify EPA and receive an identification number using Form 7710-53. EPA will issue an EPA identification number to the notifier if the notifier does not have one. See 40 CFR § 761.205 and [Notification of PCB Activities](#).

Generators of PCB waste who **do not** own or operate PCB storage facilities **subject to** the storage requirements of 40 CFR § 761.65(b) or (c)(7) do not need to submit the notification form. Generators exempted from the notification requirements are required to use the generic identification number "40 CFR PART 761" on manifests, records, and reports, unless such generators elect to use a unique EPA identification number previously assigned to them (e.g., for hazardous waste activities) by EPA or a state. See 40 CFR § 761.205(c).

- **Documentation and Record Keeping.** When performing the removal of PCBs, documentation and record keeping requirements may apply. See 40 CFR § 761.61(a)(9). Maintaining records may also be important for future maintenance, renovation, or demolition work.

Additional Regulatory References

Listed below are regulatory references to cleanup, decontamination, storage, and disposal requirements for PCB remediation waste and PCB bulk product waste. This is not intended to be a comprehensive list, and other requirements may apply. See 40 CFR Part 761 for the complete PCB regulations.

- Notification, cleanup, and disposal requirements for *PCB remediation waste*: 40 CFR § 761.61.
- Disposal requirements for *PCB bulk product waste*: 40 CFR § 761.62.
- Decontamination requirements for PCB-contaminated *non-porous surfaces*: 40 CFR § 761.79.
- Sampling *non-porous surfaces* for measurement-based use, reuse, and decontamination under 40 CFR § 761.79(b)(3): 40 CFR Part 761, Subpart P.
- Option for an approval from EPA to use *alternative decontamination or sampling procedures* (other than those specified in 40 CFR § 761.79 and 40 CFR Part 761, Subpart P): 40 CFR § 761.79(h).
- PCB Spill Cleanup Policy: 40 CFR Part 761, Subpart G.
- PCB waste marking: 40 CFR §§ 761.40 and 761.45
- PCB storage for disposal and PCB waste container storage: 40 CFR §§ 761.65 and 761.65(c)(6)
- Notification and Manifesting: 40 CFR §§ 761.205 and 761.207

Contact your EPA Regional PCB Coordinator and State Regulator

If you have concerns about PCB contamination or need more information, consult your EPA Regional PCB Coordinator at <http://www.epa.gov/pcbs/program-contacts> and your state environmental agency. EPA recommends that you make decisions about appropriate action after thoughtful consideration of all available information and all legal requirements.

EPA PCB Regional Coordinators Telephone Numbers:

EPA Region 1 (CT, MA, ME, NH, RI, VT) Tel: 617-918-1527
EPA Region 2 (NJ, NY, PR, US Virgin Islands) Tel: 732-906-6817
EPA Region 3 (DE, DC, MD, PA, VA, WV) Tel: 215-814-2177
EPA Region 4 (AL, FL, GA, KY, MS, NC, SC, TN) Tel: 404-562-8512
EPA Region 5 (IL, IN, MI, MN, OH, WI) Tel: 312-886-7890
EPA Region 6 (AK, LA, NM, OK, TX) Tel: 214-665-6796
EPA Region 7 (IA, KS, MO, NE) Tel: 913-551-7504
EPA Region 8 (CO, MT, ND, SD, UT, WY) Tel: 303-312-6625
EPA Region 9 (AZ, CA, HI, NV, American Samoa, Guam) Tel: 415-972-3360
EPA Region 10 (AK, ID, OR, WA) Tel: 206-553-1616

Footnotes

- ¹ 40 CFR § 761.3 defines non-liquid PCBs as “materials containing PCBs that by visual inspection do not flow at room temperature (25 °C or 77 °F) or from which no liquid passes when a 100 g or 100 ml representative sample is placed in a mesh number 60 ±5 percent paint filter and allowed to drain at room temperature for 5 minutes.”
- ² TSCA § 6(e)(2) prohibits the use of PCBs in any manner other than in a totally enclosed manner unless specifically authorized or excluded by regulation. In the PCB regulations at 40 CFR Part 761, authorizations appear in § 761.30 and exclusions appear in § 761.20. PCBs from any use not authorized or excluded under these rules are not authorized for use.
- ³ Environmental Health and Engineering, Inc., 2010. What You Need to Know About PCBs in Construction Materials - An Emerging Environmental Issue. Environmental Health & Engineering. Needham, MA.
- ⁴ Martin Kohler, Josef Tremp, Markus Zennegg, Cornelia Seiler, Salome Miner-Kohler, Marcel Beck, Peter Lienemann, Lukas Wegmann, and Peter Schmid. Joint Sealants: An Overlooked Diffuse Source of Polychlorinated Biphenyls in Buildings. *Environ. Sci Technol.* 2005, 39(7), 1967-1973 (2005).
- ⁵ Herrick, R. F., Stewart, J. H. & Allen, J. G. Review of PCBs in US schools: a brief history, an estimate of the number of impacted schools, and an approach for evaluating indoor air samples. *Environ Sci Pollut Res Int* 23(3), 1975–85 (2016).
- ⁶ Klosterhaus, S., Yee D., Kass, J., Wong, A., McKee L. 2011. PCBs in Caulk Project: Estimated Stock in Currently Standing Buildings in a San Francisco Bay Study Area and Releases to Stormwater during Renovation and Demolition. SFEI Contribution 651. San Francisco Estuary Institute, Oakland, CA. 49 pp.
- ⁷ Susan Klosterhaus, Lester J. McKee, Donald Yee, Jamie M. Kass, Adam Wong. Polychlorinated biphenyls in the exterior caulk of San Francisco Bay Area buildings, California, USA. *Env. International* 66, 38-43 (2014).
- ⁸ Lower Duwamish Waterway Survey of Potential PCB-Containing Building Material Sources, Washington State Department of Ecology (2011) <https://fortress.wa.gov/ecy/gsp/DocViewer.ashx?did=41052>.
- ⁹ This list is not intended to be comprehensive. Other materials not listed here may contain PCBs because of their form or function or based on year and place of manufacture and installation.
- ¹⁰ <https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs#healtheffects>.
- ¹¹ See definition of PCB remediation waste at 40 CFR § 761.3, cleanup and disposal requirements under 40 CFR § 761.61, and 40 CFR §761.61(a)(4)(ii) and (iii) for PCB decontamination standards for non-porous and porous surfaces, respectively.