U.S. Environmental Protection Agency

PCBs in Dental Office X-ray Machines[1]

PCB Information and Reference Fact Sheet

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PCBs in Dental X-ray Machines

When dental offices replace old X-ray machines, they may discover that the machines contain, or may contain, PCBs. This fact sheet is intended to help answer questions regarding how to comply with EPA regulations for PCBs.

Where are the PCBs in X-ray Machines?

X-ray machines manufactured before July 2, 1979, may contain PCB dielectric fluids at varying concentrations in the transformers and capacitors located in the machine, including the tube head. In order to determine whether the machine contains PCBs, EPA recommends contacting the X-ray machine manufacturer. For disposal, it is recommended to contact an X-ray machine service company which may handle disposal of the equipment. The X-ray machine owner can also check the EPA website for PCB commercial storage and disposal facilities (https://go.usa.gov/xf9u6). The owner should also check with state environmental agencies for information on the disposal of the X-ray components of the machine.

Additional Information:

Letter from Don R. Clay, Director, Office of Toxic Substances, to Ms. Joanne Westcott, November 8, 1984. https://go.usa.gov/xf9up

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.[2]

[1] 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.

[2] https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs#healtheffects

How are X-ray Machines Regulated in the PCB Regulations?

Regulations for Non-leaking PCB Components in an X-ray Machine:

Transformers in the X-ray machines are regulated depending on the PCB concentration in the oil. If the PCB concentration is less than 50 ppm, it is a non-PCB Transformer and is not regulated for storage or disposal under the TSCA PCB regulations (see 40 CFR 761.2(a)(1) and the definition of non-PCB Transformer at 40 CFR 761.3). For oil with PCB concentrations greater than or equal to 50 ppm, the transformer and/or the oil must be disposed of in accordance with 40 CFR 761.60(a) and (b). A transformer with a PCB concentration between 50 and 500 ppm is regulated as PCB Contaminated Equipment under 40 CFR 761.60(b)(4). If the PCB concentration is over 500 ppm, it is regulated for disposal as a PCB Transformer and must be disposed of at an EPA approved TSCA PCB incinerator or an EPA approved TSCA chemical waste landfill in accordance with 40 CFR 761.60(b)(1).[3]

If X-ray machines have been serviced by an X-ray machine service provider, the original PCB concentration in the oil may have changed. The owner may have the transformer oil tested. See 40 CFR 761.2(b)(1). Instead of testing, the owner may assume the PCB concentration is ≥ 500 parts per million (ppm), in which case the transformer is a PCB Transformer. If a non-leaking PCB transformer has less than three pounds of fluid, it can be assumed to have less than 50 ppm PCBs and is therefore a non-PCB Transformer. Also, PCB concentration assumptions can be made based on the transformer manufacturing date in accordance with 40 CFR 761.2(a)(2) or (3).

Capacitors in X-ray machines manufactured before July 2, 1979 whose PCB concentration is not established, or whose date of manufacture is unknown, must be assumed to contain PCB concentrations ≥500 ppm. See 40 CFR 761.2(a)(4). These and other PCB Capacitors generally must be disposed at an EPA approved TSCA PCB incinerator (see 40 CFR 761.60(b) and the definition of PCB Capacitor at 40 CFR 761.3). Leaking capacitors must be disposed of in accordance with 40 CFR 761.60(b)(6) which requires disposal at an EPA approved TSCA PCB incinerator if the PCB concentration is over 500 ppm. If the capacitor meets the definition of a small capacitor as defined in 40 CFR 761.3 under "*Capacitor, (1) Small capacitor*" and is not leaking, it may be disposed as municipal solid waste (see 40 CFR 761.60(b)(2)(ii)). A capacitor marked at the time of manufacture with the statement "No PCBs" in accordance with 40 CFR 761.40(g) may be assumed not to contain PCBs. See 40 CFR 761.2(a)(4).

The tube head: Dental offices should take note that the tube head may also contain a PCB Capacitor. The owner may assume the capacitor contains ≥ 500 ppm PCBs, in which case the whole tube head must be disposed at an EPA approved TSCA PCB incinerator (see 40 CFR 761.60(b)(2)(iii)(A)). The glass portion of the tube head is under a vacuum and should not be broken. If the capacitor can be removed without breaking the glass, the owner can determine if the capacitor is a PCB Capacitor and make a disposal determination (see paragraph above and 40 CFR 761.2(a)(4)).

[3] The PCB regulations can be found at 40 CFR Part 761, online at https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr761_main_02.tpl

How are X-Ray Machines Regulated in the PCB Regulations?

Regulations for Leaking PCB Components in an X-ray Machine

If any PCB-containing electrical component with a PCB concentration over 500 ppm is leaking oil, the entire X-ray machine must be disposed at an approved PCB incineration facility (see 40 CFR 761.60(b)(6). It may be stored for disposal for up to 30 days if it is stored in a container in a temporary storage area in accordance with 40 CFR 761.65(c)(1), or up to one year if stored in a fully compliant PCB storage area as described under 40 CFR 761.65(b)(1). An extension to the 1-year storage limitation can be granted under 40 CFR 761.65(a). The leaking component(s) should be removed from the machine and handled and stored as described under 40 CFR 761.65(c).

Under 40 CFR 761.50(b)(2), PCB items that are no longer intact and non-leaking are regulated for disposal as PCB bulk-product waste under § 761.62(a) or (c).

Is the X-ray Machine Subject to PCB Storage Requirements Before it is Disposed?

Yes, the X-ray machine is subject to PCB storage requirements. The X-ray machine generally must be disposed within one year from the date of removal from service for disposal (see 40 CFR 761.65(a)). The machine may be stored for disposal during this time, but after 30 days of temporary storage, the machine must be stored in a fully compliant PCB storage area as described in 40 CFR 761.65(b)(1). The temporary storage requirements can be found under 40 CFR 761.65(c)(1). The machine containing PCB components, or non-leaking PCB components if they have been removed from the machine, may be stored under temporary storage rules for up to 30 days from when the machine was removed from service. Leaking PCB components may also be placed in temporary storage, but these components must be removed from the machine and placed in a non-leaking PCB container with sorbent material. See 40 CFR 761.65(c)(1)(ii). The container should be labeled with the date of removal from service (40 CFR 761.65(c)(1)). If PCB components are leaking but not removed from the machine, the entire machine should be placed inside a containment structure.

Manifesting and EPA ID Numbers

Dental offices with PCB X-ray machine components designated for disposal are considered PCB waste generators and must prepare a manifest on EPA Form 8700-22 (40 CFR 761.207). The manifest form requires an ID number for the generator of the waste, which can be obtained by submitting the Notification of PCB Activity form to EPA (Form 7710-53), if required. EPA will issue a unique EPA identification number to the notifier if the notifier does not have one. **Generators who do not own or operate PCB commercial 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 shall use the generic identification number "**40 CFR Part 761**" on manifests, unless such generators elect to use a unique EPA identification number previously assigned to them under RCRA by EPA or a state. See 40 CFR § 761.205 and https://www.epa.gov/pcbs/notifications-polychlorinated-biphenyl-pcb-activities.

How are X-ray Machines Regulated in the PCB Regulations?

After Non-leaking PCB Components have been Removed, How Does One Dispose of the Rest of the X-ray Machine?

After any non-leaking PCB components have been removed, the power source should be removed from the X-ray machine. Housings are generally made of lead, so EPA recommends contacting your state environmental agency to determine if the housing could be a hazardous waste before disposal at a landfill. The machine can be disposed as municipal solid waste unless the state agency has other regulations for the disposal of X-ray equipment. The owner should contact the state environmental agency for information and the landfill operator to see if it will accept the machine before shipping for disposal. For the X-ray component of the machine, EPA does not regulate the radioactive portion of the machine. States typically regulate the radioactive components and should be contacted for guidance on disposal.

Contact your State and EPA Regional PCB Coordinator

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 Region 1 (CT, MA, ME, NH, RI, VT) Tel: 617-918-1527
EPA Region 2 (NJ, NY, PR, U.S. Virgin Islands) Tel: 212-637-3759
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: 303-312-6446
EPA Region 9 (AZ, CA, HI, NV, American Samoa, Guam, Northern Mariana Islands) Tel: 415-972-3360
EPA Region 10 (AK, ID, OR, WA) Tel: 206-553-1616