



Guidance on Requirements for Landfill Disposal of Processed CRT Glass and E-Cycle Wisconsin Eligibility

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Purpose

This document provides guidance on the steps necessary to gain approval for landfill disposal of processed cathode ray tube (CRT) glass in Wisconsin. It also defines the eligibility of landfilled glass for manufacturer targets under the E-Cycle Wisconsin program.

Background

Many older TVs and computer monitors contain CRTs. The CRTs are made of leaded glass, non-leaded glass and metals. CRTs are considered hazardous waste because of the lead and other chemicals they contain. Electronics collectors and recyclers receive conditional exemptions from most hazardous waste requirements, such as using hazardous waste manifests for shipping, if the CRTs are destined for recycling.

Under current U.S. Environmental Protection Agency hazardous waste regulations [40 CFR 261.4(a)(22) and 40 CFR 261.39] and Department of Natural Resources policy, certain CRTs are exempt from regulation as hazardous waste if they are legitimately recycled by the following methods:

1. The glass from CRTs can be melted down and made into new CRTs. This is often called glass-to-glass recycling. Since the market for new CRT-style TVs and monitors has declined, however, this method will have a limited lifetime.
2. The leaded glass from CRTs can be sent to lead or copper smelting facilities.¹
3. The glass from CRTs can be incorporated into tiles or other ceramics, provided the process meets all state and federal environmental standards and the EPA criteria for legitimate recycling.²

Because of the decline in markets for leaded CRT glass—with glass furnaces and smelters charging recyclers, rather than paying them, for the glass—many electronics recyclers have been seeking alternative end uses or other recycling methods for CRT glass. Recyclers wishing to use other downstream processing/use options for CRTs should contact the DNR to discuss on a case-by-case basis. Some have also looked to disposal in hazardous waste or solid waste landfills. Ideally, the recyclers look for local options to reduce transportation costs.

Options for panel (non-leaded) glass

Cleaned panel (non-leaded) glass may be used for applications such as road bed aggregate, pipe bedding or drainage media if the end user obtains a low-hazard waste grant of exemption from the DNR, including submittal of testing results to demonstrate the material is not hazardous and meets other specifications. Information about applying for a low-hazard waste exemption is available from the DNR regional solid waste contacts (list available at <http://dnr.wi.gov/topic/Waste/>).

To use separated, cleaned panel glass in a landfill for road bed, alternative daily cover or drainage media, the landfill operator should contact the regional DNR plan reviewer assigned to the facility.

CRT glass types

The front panel of a CRT is made of non-leaded glass, though it contains a phosphor coating that must be cleaned off before the glass can be safely reused.

The funnel portion of a CRT is made from leaded glass.

Some electronics recyclers have developed methods to separate the panel glass from the funnel glass, crush it and clean or treat it, so that the leaded and non-leaded glass can go to separate downstream markets.

¹ As of June 2014, only lead smelters are specifically included in the federal CRT rule, but state approval for sending glass to other types of smelters is possible. Contact the DNR at DNRWAE-cycling@wisconsin.gov if you have questions.

² See the 2014 "Sims letter," https://www3.epa.gov/epawaste/hazard/recycling/electron/fnl_itr_sims.pdf.

E-Cycle Wisconsin eligibility

The weight of panel glass from CRTs received through the E-Cycle Wisconsin program used in applications such as road bed aggregate, pipe bedding or drainage media is eligible for manufacturer targets under E-Cycle Wisconsin unless it is used within a landfill.

Options for funnel (leaded) glass

Hazardous waste landfill disposal

If sending funnel glass to a glass-to-glass furnace, lead or copper smelter, or other approved recycling process is not an option, the glass may be sent to a permitted hazardous waste landfill for disposal. Doing so requires the recycler (generator) to follow the hazardous waste requirements, including manifesting the waste shipment.

For more information, see the DNR's hazardous waste manifest requirements page (<http://dnr.wi.gov/topic/Waste/Manifest.html>) and hazardous waste rules, chs. NR 660–670 (<http://dnr.wi.gov/topic/Waste/Laws.html#tabx2>)

Alternative/new recycling options

Several companies have been working on methods for extracting the lead from funnel glass, or stabilizing or encapsulating it so that the lead will not leach out and the glass is no longer considered hazardous waste.

For more information on hazardous waste requirements applicable to recyclers that treat leaded glass, please contact the DNR hazardous waste staff in the region where your business is located (list available at <http://dnr.wi.gov/topic/waste/>).

If you are sending funnel glass to a treatment, storage and disposal (TSD) facility that stabilizes the lead, the glass has to be manifested as a hazardous waste. If you are sending funnel glass to be managed under the federal CRT rule or it meets the definition of an excluded recyclable material, use only a bill of lading, but check state-specific guidance. The DNR also recommends checking with the environmental regulatory agency in the state where the recycler is located to ensure their process is considered legitimate recycling.

Solid waste landfill use or disposal

CRT glass may only be sent to a municipal or industrial solid waste landfill if it no longer exhibits hazardous waste characteristics and meets the land disposal restriction requirements (see #1 in the next section). In Wisconsin, it is considered disposal if the glass is sent to a landfill, regardless of whether the glass is used for alternative daily cover, road beds or other purposes within the landfill.

The next section outlines steps and approvals necessary for sending CRT glass to a non-hazardous waste landfill.

What steps are needed to gain approval for landfill disposal of processed CRT glass in Wisconsin?

The following process applies to a facility that is receiving intact CRTs and processing and treating them. Once the facility processing the glass has completed the first two steps listed below, the treated glass could go to a landfill for disposal without further approvals. If the landfill will be using the glass for road beds, drainage media, alternative daily cover or other uses, a third step is required.

If the processing facility is located outside of Wisconsin, it does not need DNR approvals. If the glass is being sent to a Wisconsin landfill, however, the CRT processor would need to provide the landfill with representative analytical sample data showing the glass is not hazardous waste. The Wisconsin landfill would still need DNR approval to use the glass for alternative daily cover or other uses within the landfill.

1. Demonstrate that glass does not exceed the TCLP and meets the land disposal restriction requirements

For processed CRT glass to be sent to a solid waste landfill, the recycler (generator) must demonstrate that the glass does not exceed the **toxic characteristic leaching procedure (TCLP)** threshold of 5 parts per million for lead. The glass must also meet the **land disposal requirement (LDR)** of 0.75 ppm for lead.

If your facility has processed and treated CRT glass with the intention of sending it to a municipal or industrial solid waste landfill, you must send DNR hazardous waste staff documentation explaining your treatment process and representative laboratory analytical data showing that the processed CRT glass meets both the TCLP and LDR criteria. The hazardous waste staff will determine whether your process is exempt from hazardous waste treatment facility licensing requirements. The staff can then send you a letter to confirm whether your process and the resulting glass are exempt from hazardous waste requirements assuming there are no changes to your process or to your CRT feedstock.

A list of DNR hazardous waste contacts is available at <http://dnr.wi.gov/topic/waste/>. Contact the staff person listed for the county in which your business is located.

2. Obtain a DNR solid waste processing license

If your treatment process meets the conditions for an exemption from the hazardous waste treatment license requirements, you will need to apply for a solid waste processing license. Requirements for a solid waste processing license may include proof of owner financial responsibility under s. NR 502.04(6), Wis. Adm. Code. For more information, see <http://dnr.wi.gov/topic/Waste/Solid.html>.

3. Landfill must request DNR approval if the glass will be used for alternative daily cover or other applications within the landfill

If a Wisconsin landfill would like to use treated, non-hazardous CRT glass for alternative daily cover, road beds, drainage media or similar uses, the landfill must obtain approval from the regional DNR plan review staff assigned to the facility.

Can the weight of landfilled CRT glass be counted toward manufacturer recycling targets under E-Cycle Wisconsin?

Wisconsin's electronics recycling law (s. 287.17, Wis. Stats.) created a manufacturer-funded recycling program, called E-Cycle Wisconsin, for several types of electronics from households and K-12 schools. Collectors and recyclers working on behalf of manufacturers must register with the DNR and meet certain requirements.

Statutory definition of recycling and E-Cycle Wisconsin eligibility

Under s. 287.17(5)(b), a manufacturer must report the total weight of eligible electronic devices that were collected by or delivered to the manufacturer, or to a registered recycler on behalf of the manufacturer, for recycling. **Recycling** is defined in s. 287.17(1)(m) as "preparing eligible electronic devices for use in manufacturing processes or for recovery of useable materials and delivering the materials for use." Section 287.17(1)(m) specifically states that **recycling does not include land disposal of recyclable materials**.

In practice, a certain amount of residual material from an eligible electronic device may be landfilled if there are no recycling or reuse markets available. If the amount is negligible and administratively impractical to discern, the total weight of the collected electronic devices may be counted toward the total weight calculated for reporting purposes. However, if CRT glass or other major components that make up a large percentage (by weight) of the eligible electronic device are landfilled on a regular basis, it would appear that those materials from the devices are not being collected or delivered for the purpose of recycling.

Therefore, in general, should the DNR determine that a recycler is sending a significant (i.e., more than negligible as described above) amount of material from the electronic devices collected under E-Cycle Wisconsin to a solid or

hazardous waste landfill, the landfilled weight would not be eligible for E-Cycle Wisconsin and should not be included in the total weight of recycled electronics reported by recyclers and manufacturers to the DNR. **This applies regardless of whether the registered recycling facility is located in Wisconsin.**

Special considerations for counting weight of CRT glass under E-Cycle Wisconsin

Given the tightening of CRT glass markets, the DNR understands that it is becoming difficult for some CRT glass processors to find recycling outlets for all of their CRT glass. Some processors have opted to send some of the leaded glass they generate to hazardous waste landfills, or treat the glass and send it to a solid waste landfill.

It may be impossible for electronics recyclers to determine whether specific loads of CRT glass sent to a landfill came from E-Cycle Wisconsin, because electronics are usually weighed when they enter a recycling facility, and the glass from devices collected under E-Cycle Wisconsin may be comingled with glass from other sources during the CRT glass separation, crushing and cleaning process. The amount of glass sent to landfills may also vary from month to month, depending on the amount of glass that furnaces and smelters are willing to accept.

Given these constraints, recyclers that landfill a portion of the CRT glass they generate would still be able to count CRT glass weight under E-Cycle Wisconsin if they do the following:

1. estimate the total weight of CRT glass contained in eligible electronic devices received under E-Cycle Wisconsin during a given program year; AND
2. demonstrate to the DNR that an equivalent weight of CRT glass processed from all sources was sent to recycling or reuse markets during the same program year, and that this recycled weight has not already been counted toward another state take-back program.

For example, if a recycler estimates it received 1 million pounds of CRT glass in the electronics it collected under E-Cycle Wisconsin; it would need to be able to show records to the DNR indicating that it sent at least 1 million pounds of CRT glass to recycling markets, and that it has not already counted this same 1 million pounds under another state take-back program. If the recycler can only document sending 900,000 pounds to recycling markets, only those 900,000 pounds may be counted toward manufacturer recycling targets under E-Cycle Wisconsin.

Is CRT glass sent to other alternative processors eligible for manufacturer credit under E-Cycle Wisconsin?

The DNR's goal is to ensure that glass collected under E-Cycle Wisconsin does not end up in stockpiles and is instead legitimately recycled. We also want to maintain a level playing field among recyclers and manufacturers. There are two main factors governing whether CRT glass sent to downstream markets other than glass-to-glass or lead smelters is eligible for manufacturer credit.

1. Does the process meet the definition of recycling?

As discussed in the previous section, **recycling** is defined in s. 287.17(1)(m) as "preparing eligible electronic devices for use in manufacturing processes or for recovery of useable materials and delivering the materials for use."

If you are planning to send CRTs or processed CRT glass to a downstream market other than glass-to-glass or a traditional lead smelter, you should first contact DNR E-Cycle Wisconsin staff to confirm that the market would be considered recycling.

In general, incorporating leaded or unleaded CRT glass into ceramic tiles would be considered recycling (following guidance issued in 2014 by the U.S. EPA), as long as the tilemaking process and resulting product meet applicable environmental and safety standards.

Processes that extract lead from CRT glass for reuse would also generally be considered recycling, again if the extraction process meets applicable environmental and safety standards.

2. Does the facility you are sending CRT glass to have a process that is up and running?

Glass that is stored for long periods in anticipation of using it in a process that is not yet up and running is not eligible for manufacturer credit. This applies to glass that may be stored long term in your own facilities, as well as to glass sent to a downstream vendor that is storing it. Questions about what constitutes long-term storage are handled on a case-by-case basis and will depend on circumstances such as why the glass is being stored and how the storage dates relate to the E-Cycle Wisconsin program year.

DNR E-Cycle Wisconsin staff are happy to discuss downstream recycler processes on a case-by-case basis. Please contact us at DNRWae-cycling@wisconsin.gov if you have questions about whether covered electronics are eligible for manufacturer credit under E-Cycle Wisconsin.

More information

For more information on solid and hazardous waste requirements and lists of DNR contacts, see <http://dnr.wi.gov/topic/waste/>.

For more information on electronics recycling and E-Cycle Wisconsin, see <http://dnr.wi.gov/topic/ecycle/>.

For more information on federal regulations for CRTs, including the CRT rule, see <http://www.epa.gov/osw/hazard/recycling/electron/>.

You can also contact the DNR Waste and Materials Management program using the phone number and email below.



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