



DISPOSING OF E-CIGARETTE WASTE

FAQ for Schools and Other Institutions



Schools and other public institutions are coping with many unforeseen consequences of the e-cigarette epidemic.¹ From installing costly bathroom monitors to redirecting counselor time to deal with the ramifications of addiction, schools and public institutions are expending significant resources to respond to an industry-created crisis.

An additional — yet often overlooked — consequence of the youth vaping epidemic is that institutions like schools must deal with increasing amounts of dangerous e-cigarette waste. This accumulation of waste is a direct result of years of marketing vapes to adolescents.²



The waste stream is a result of the accumulation of e-cigarette devices, e-liquid containers, cartridges (or “pods”) that contain liquid nicotine, and devices that contain lithium-ion batteries and other e-waste. E-cigarettes are both hazardous waste and electronic waste (“e-waste”).³ They contain three main components: a lithium-ion battery, a heating component, and a cartridge that holds the nicotine liquid (or “juice”), which is often flavored.⁴ The cartridge contains concentrated amounts of nicotine liquid, which is considered hazardous waste.⁵ Concentrated nicotine is incredibly harmful if it is ingested or comes in contact with human skin.⁶ The lithium batteries in e-cigarettes are prone to explosions and fires, and have caused at least two deaths in the United States.⁷ E-cigarettes have been marketed as “disposable” by the industry, so they are regularly thrown away into the normal trash or littered. About 53 percent of vapes that are sold are disposable, meaning they cannot be refilled and used again after the initial cartridge runs out.⁸

Regular waste disposal is not suited for hazardous waste, including concentrated nicotine and explosive lithium batteries. There are also special restrictions on how hazardous waste can be treated and handled under federal regulations.⁹ While older e-cigarette devices like Juul had a removable battery that could have been recycled,¹⁰ newer devices have built-in batteries, which makes the task of properly disposing of these devices even more difficult. Also, the quantity of lithium in newer devices is too small to be recovered for reuse.¹¹ Incineration seems to be the most common disposable method available for such devices at this time, as revealed by methods currently used by waste management companies and facilities. Incinerating lithium batteries is dangerous, time-consuming, and destructive for the environment in terms of carbon emissions. The cartridge containing concentrated nicotine must also be incinerated, as there is no reuse for this hazardous waste.

The additional burden of figuring out how to dispose of electronic cigarette waste can be overwhelming for public institutions. Importantly, under federal law,¹² e-cigarette devices, e-liquid containers, and batteries are likely to be hazardous waste when schools, courts, and airports confiscate and dispose of them.¹³ As a result, handling and disposing of this waste needs to be done in compliance with federal and state laws.

This factsheet provides a brief summary of considerations for schools, airports, courts, and other institutions subject to the Resource Conservation and Recovery Act (RCRA) when dealing with pressing questions about handling and disposing of mounting piles of e-cigarette waste.¹⁴ It explains why e-cigarettes are considered hazardous waste, then outlines steps RCRA-regulated entities are required to take under the law to ensure the health and safety of students, employees, and the public.



Q: Who is covered under RCRA?

A: Virtually anyone may be covered under RCRA if they are accumulating (collecting) waste. Accumulating the product alone is not enough to trigger RCRA. Tobacco retailers would not be covered just because they are selling electronic smoking devices, but if they have a certain number of these devices, which they plan to throw out, they would be subject to RCRA. Any person or institution collecting enough hazardous waste that they plan to dispose of would be subject to RCRA.

Q: Is liquid nicotine a hazardous waste?

A: Yes, nicotine (including nicotine salts) is a listed hazardous waste under RCRA. While the ins and outs of hazardous waste regulation are beyond the scope of this publication, the fundamental takeaway for schools is that in 1980, the Environmental Protection Agency (EPA) listed “nicotine & salts”¹⁵ as an “acute hazardous waste.”

An acute hazardous waste is defined as hazardous waste that is fatal to humans in low doses, has demonstrated toxicity to test subjects, or is “otherwise capable of causing or significantly

contributing to an increase in serious irreversible, or incapacitating reversible, illness.” The serious risks of exposure to acute hazardous waste are mitigated by the legal requirements to handle, treat, and dispose of liquid nicotine properly.

EPA’s listing of nicotine as acute hazardous waste occurred before liquid nicotine was used in JUUL pods and other e-cigarettes — but the EPA affirmed its application to nicotine e-liquids in 2015 and again in 2019.¹⁶ The vaping industry asked EPA to exempt e-liquids from the definition of acute hazardous waste and the agency refused to do so.

Q: What responsibilities does RCRA place on schools that accumulate hazardous waste in the form of e-cigarette devices and e-liquids?

A: Schools and other entities that accumulate RCRA-listed chemicals and then need to dispose of them as waste — designated as “generators” of waste under RCRA’s terminology — are assigned special responsibilities to ensure that this waste is handled and disposed of in a way that will not place human health or the environment at risk. Because nicotine is an acute hazardous waste, a generator can accumulate only 1 kilogram of this listed waste before being treated as a “large quantity generator.” Even if they accumulate less than that amount, or have e-cigarette devices without any nicotine, generators have legal duties under the law as sketched out below.

Large Quantity Generators of Nicotine Waste

A large quantity generator must comply with special handling requirements, including:¹⁷

- Notifying its hazardous waste regulatory entity and filling out a special form to obtain an EPA identification number;
- Storing nicotine waste in properly constructed and labeled/marked storage containers that clearly identify the material and hazard and indicate the accumulation start date;
- Ensuring that this hazardous waste is not stored with other types of toxic or hazardous waste (e.g., specifically, waste with which it could potentially interact or react);¹⁸
- Carefully storing the container so that it does not rupture or leak, and ensuring that it remains closed, except for when additional hazardous waste is added to the storage container;
- Training all employees involved in the management and/or documentation of hazardous waste activities on-the job and through classroom/online hazardous waste classes, covering job duties during normal operations and emergencies; and

- Inspecting the hazardous waste on a weekly basis to make sure there is no leakage, and that the labeling and handling requirements comply with federal standards.

Large quantity generators also must ensure that the accumulated hazardous waste does not remain on site for more than 90 days, or they will become subject to regulations governing Waste, Treatment, Storage, and Disposal facilities.¹⁹ The generator (e.g., a school) is responsible for shipping the storage container to a properly permitted hazardous waste treatment, storage, or disposal facility. While recycling the e-cigarettes would make them no longer subject to RCRA hazardous waste requirements, the problem is that, to date, no network of legitimate recycling facilities that recycle nicotine for later re-use appear to exist.²⁰

Very Small Quantity Generators of Nicotine Waste

Even if a school is not a large quantity generator, storing any amount of e-liquid for disposal makes the school a “very small quantity generator,” which still requires the school to comply with some of the requirements above, as well as any other applicable local or state management requirements. A very small quantity generator still must ensure that the waste is delivered to a hazardous waste collection facility authorized to accept the waste in accordance with hazardous waste standards.

Generators of Universal Waste – Batteries

Lithium-ion batteries, which are found in rechargeable e-cigarettes, are problematic in that they are known to explode and catch fire,²¹ putting both the public and sanitation workers at risk. A lithium-ion battery may explode for a number of reasons, including damage or puncture, being overcharged in rechargeable devices, overheating, short circuiting, internal cell failure, and manufacturing deficiencies.²² While e-cigarettes’ batteries do not need to be stored and disposed of in the same way as nicotine-containing waste, they should be handled carefully, and battery storage containers should be kept in good condition and properly labeled with a description of the type of waste. Check directly with your state’s hazardous waste regulatory agency for standards applicable to universal waste and batteries.

Q: Why can’t schools just throw e-liquid in the garbage with other (non-hazardous) waste products?

A: Throwing e-liquid into the garbage is dangerous for humans and animals and bad for the environment. As mentioned above, concentrated nicotine is incredibly dangerous if absorbed into the skin, and destructive to the soil and water if it leaches into the environment.



Federal law exempts from the RCRA definition of hazardous waste all consumer products that are designed for use at a consumer’s residence, used in the residence, and disposed of by residents — instead, calling this carve-out “household hazardous waste.” Household hazardous waste is subject to state regulation.²³ For instance, states like California and Minnesota may permit some Very Small Quantity Generators to dispose of their waste at household hazardous waste facilities, even if they are not residences. Generally, these are states that already require household hazardous waste from residences to be disposed of at appropriate facilities.

That said, schools do not qualify for this treatment — they are not residents or residences under the law — and federal law uniformly treats this form of waste, when used away from the home and/or accumulated by entities that are not households, as hazardous waste. For this reason, schools and other public entities are treated the same as businesses under RCRA’s classification and treatment of hazardous waste generators. Even “used” (or “spent”) pods contain unused nicotine and should be treated carefully and not discarded in the regular trash.

The school-based challenges associated with the accumulation of e-cigarette waste, treatment, and disposal are relatively new and rapidly evolving. Given that federal law treats nicotine as hazardous waste, to comply with the law and best protect the environment and human health, best practices for schools include:

- Public health officials and educators consulting with state and local government hazardous waste experts to determine the best way to comply with federal, state, and local hazardous waste requirements; and
- Providing schools with state-specific guidance and resources, prepared by state and/or local government agencies charged with regulating hazardous waste.

Q: Can e-cigarette batteries also be hazardous waste?

A: Yes, batteries are also often a type of hazardous waste. State laws might vary on how particular types of batteries are treated, but federal standards treat rechargeable lithium-ion batteries as universal waste — a type of hazardous waste under RCRA. Given the difficulty in determining which types of batteries various e-cigarettes contain, and the prevalence of lithium-ion batteries in popular products, it is a best practice to comply with universal waste requirements and ensure that batteries are disposed of at hazardous waste facilities that accept universal waste.

Q: What other information is available on these issues?

- Boulder County, Colorado has published a guidance for schools.
- Minnesota also has an established guidance for businesses (which could apply equally to schools as fellow non-household waste generators).
- Delaware has published a guidance for vape shops regarding hazardous waste.
- Vermont has published a safe vape disposal guidance for schools.
- Wisconsin has published a guidance for schools and institutions.
- California has published a guidance on how to properly dispose of these devices.
- Utah has published a guidance for schools and other generators on proper disposal.
- Oregon has published disposal guidance for schools.

- The EPA has issued an [opinion letter](#) on e-liquid as a hazardous waste.
- The EPA has also issued an [opinion letter](#) on the recycling of e-liquid wastes.
- The EPA has created a [comparison chart](#) of some of the requirements for different levels of generators of acute hazardous wastes and universal wastes.
- The Public Health Law Center’s [policy resources](#) on the environmental impacts of the tobacco industry are available on our website.

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Endnotes

- 1 The Public Health Law Center recognizes that traditional and commercial tobacco are different in the ways they are planted, grown, harvested, and used. Traditional tobacco is and has been used in sacred ways by Indigenous communities and tribes for centuries. In comparison, commercial tobacco is manufactured with chemical additives for recreational use and profit, resulting in disease and death. For more information, visit the National Native Network website: <http://www.keepitsacred.itcmi.org>. When the word “tobacco” is used throughout this document, a commercial context is implied and intended.
- 2 Christina Jewett & Julie Caswell, *JUUL Reaches \$462 Million Settlement with New York, California and Other States*, N.Y. TIMES (Apr. 12, 2023), <https://www.nytimes.com/2023/04/12/health/juul-vaping-settlement-new-york-california.html>.
- 3 Jamie Ducharme, *The Overlooked Environmental Impact of Vaping*, TIME (July 11, 2023), <https://time.com/6293772/disposable-vapes-plastic-waste>.
- 4 *Do E-Cigarettes Require Hazardous Waste Management?*, Hazardous Waste Experts (July 17, 2017), <https://www.hazardouswasteexperts.com/hazardous-waste-management-e-cigarettes>.
- 5 *Where Are the Management Standards for Hazardous Waste Pharmaceuticals and Amendment to the P075 Listing for Nicotine in Effect?*, U.S. Environmental Protection Agency (Aug. 18, 2023), <https://www.epa.gov/hwgenerators/where-are-management-standards-hazardous-waste-pharmaceuticals-and-amendment-p075>.
- 6 Leonard P. Lockhart, *Nicotine Poisoning*, 1 BRITISH MED. J. 246 (1933), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2368002/?page=2>.
- 7 *Exploding E-Cigarettes*, Beasley Allen Law Firm, <https://www.beasleyallen.com/e-cigarette-explosions>.
- 8 *New Vaping Problem: How to Safely Get Rid of Them*, KREM2 (Oct. 22, 2023), <https://www.krem.com/article/news/national/communities-cant-recycle-trash-disposable-e-cigarettes/527-dc1cf459-0cc5-4b2b-b89e-575bfd39ba21>.
- 9 Public Health Law Center, *Tobacco Product Waste: A Public Health and Environmental Toolkit* (2022), <https://www.publichealthlawcenter.org/sites/default/files/resources/Tobacco-Product-Waste-Toolkit.pdf>.

- 10 Matthew Perrone, *E-Cigarettes Pose a New Environmental Dilemma — the “Insidious Devices” Can Be Neither Recycled Nor Thrown in the Trash*, FORTUNE (Oct. 19, 2023), <https://fortune.com/2023/10/19/e-cigarettes-pose-a-new-environmental-dilemma-the-insidious-devices-can-be-neither-recycled-nor-thrown-in-the-trash>.
- 11 *New Vaping Problem*, *supra* note 6.
- 12 This provision is implemented by states that meet federal requirements. More information is available on the EPA [website](#).
- 13 Under the Resource Conservation and Recovery Act, the burden is on schools and other entities to determine whether their solid waste qualifies as hazardous waste. As the EPA explains: “Once a generator determines that their waste meets the definition of a solid waste, they investigate whether or not the waste is a listed or characteristic hazardous waste.” More information is available on the EPA [website](#).
- 14 This resource is unable to address the details and particularities of each jurisdiction, and it should not be considered a substitute for obtaining legal advice from an attorney familiar with your jurisdiction’s laws.
- 15 For more on nicotine salts and the specialized reaction developed by JUUL to create them, see Rachel Becker, *JUUL’s Nicotine Salts Are Dominating the Market — And Other Companies Want In*, THE VERGE (Nov. 21, 2018), <https://www.theverge.com/2018/11/21/18105969/juul-vaping-nicotine-salts-electronic-cigarettes-myblu-vuse-markten>.
- 16 The nicotine rule was updated in 2023. See Hazardous Waste Generator Improvements Rule, the Hazardous Waste Pharmaceuticals Rule, and the Definition of Solid Waste Rule; Technical Corrections, 88 Fed. Reg. 54086 (Aug. 9, 2023) (to be codified at 40 C.F.R. pts. 260–266, 270–71, 441), <https://www.govinfo.gov/content/pkg/FR-2023-08-09/pdf/2023-14731.pdf>.
- 17 For a full list compiled by one state agency, see this [guidance](#) from the Delaware Department of Natural Resources and Environmental Control.
- 18 RCRA was initially passed, in part, to deal with the vexing problem of interacting hazardous wastes — particularly those wastes that could ignite or cause a chemical reaction. While many of the waste products accumulated by schools are cartridges that can be removed from the battery-containing device, or e-juice containers of liquid nicotine, there are some disposable versions of e-cigarettes that contain liquid containers integral to the device. This presents a dangerous problem as the wastes build up, as it is more difficult to ensure that potentially explosive batteries are separated from the e-liquid itself.
- 19 See 40 C.F.R. § 262.17(b); 40 C.F.R. § 264.
- 20 See this [2015 EPA letter](#), which describes factors that need to be met for legitimate recycling of e-cigarettes.
- 21 Lithium-ion batteries have caused numerous garbage truck and recycling facility fires, not to mention the long history of lithium-ion battery fires on planes tracked by the Federal Aviation Administration. More information is available on the FAA [website](#). For a list of e-cigarette-related property damage and injuries, see the American Nonsmokers’ Rights Foundation’s [tracker](#) of news reports of e-cigarette explosions and fires.
- 22 *Coding an Electronic Cigarette Fire*, U.S. Fire Administration (Dec. 17, 2020), <https://www.usfa.fema.gov/nfirs/coding-help/electronic-cigarettes/>.
- 23 Since 1988, the EPA has stated its position that states can and should choose to apply all hazardous waste legal standards to household hazardous waste, even if the EPA cannot mandate it directly. More information can be found in the EPA’s 1988 [Memorandum](#) to the Waste Management Division Directors.