

3745-270-42

Treatment standards expressed as specified technologies.

(A) The following wastes in the table in rule 3745-270-40 of the Administrative Code "Treatment Standards for Hazardous Wastes," for which standards are expressed as a treatment method rather than a concentration level, must be treated using the technology or technologies specified in ~~table 4 of the table~~ the table in this rule.

Table 4: Technology Codes and Description of Technology-Based Standards	
Technology code	Description of technology-based standards
ADGAS	Venting of compressed gases into an absorbing or reacting media (i.e., solid or liquid) - venting can be accomplished through physical release utilizing valves/piping; physical penetration of the container; and/or penetration through detonation.
AMLGM	Amalgamation of liquid, elemental mercury contaminated with radioactive materials utilizing inorganic reagents such as copper, zinc, nickel, gold, and sulfur that result in a nonliquid, semi-solid amalgam and thereby reducing potential emissions of elemental mercury vapors to the air.
BIODG	Biodegradation of organics or non-metallic inorganics (i.e., degradable inorganics that contain the elements of phosphorus, nitrogen, and sulfur) in units operated under either aerobic or anaerobic conditions such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., total organic carbon can often be used as an indicator parameter for the biodegradation of many organic constituents that cannot be directly analyzed in wastewater residues).
CARBN	Carbon adsorption (granulated or powdered) of non-metallic inorganics, organo-metallics, and/or organic constituents, operated such that a surrogate compound or indicator parameter has not undergone breakthrough (e.g., total organic carbon can often be used as an indicator parameter for the adsorption of many organic constituents that cannot be directly analyzed in wastewater residues). Breakthrough occurs when the carbon has become saturated with the constituent (or indicator parameter) and substantial change in adsorption rate associated with that constituent occurs.
CHOXD	Chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combinations of reagents: (1) hypochlorite (e.g., bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or ultraviolet light assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permangantes; and/or (9) other oxidizing reagents of

	<p>equivalent efficiency, performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., total organic carbon can often be used as an indicator parameter for the oxidation of many organic constituents that cannot be directly analyzed in wastewater residues). Chemical oxidation specifically includes what is commonly referred to as alkaline chlorination.</p>
CHRED	<p>Chemical reduction utilizing the following reducing reagents (or waste reagents) or combinations of reagents: (1) sulfur dioxide; (2) sodium, potassium, or alkali salts or sulfites, bisulfites, metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts; and/or (5) other reducing reagents of equivalent efficiency, performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., total organic halogens can often be used as an indicator parameter for the reduction of many halogenated organic constituents that cannot be directly analyzed in wastewater residues). Chemical reduction is commonly used for the reduction of hexavalent chromium to the trivalent state.</p>
CMBST	<p>High temperature organic destruction technologies, such as combustion in incinerators, boilers, or industrial furnaces operated in accordance with the applicable requirements of rules 3745-57-40 to 3745-57-51, or 3745-68-40 to 3745-68-52, or 3745-266-100 to 3745-266-112 of the Administrative Code, and in other units operated in accordance with applicable technical operating requirements in the hazardous waste rules; and certain non-combustive technologies, such as the catalytic extraction process.</p>
DEACT	<p>Deactivation to remove the hazardous characteristics of a waste due to its ignitability, corrosivity, and/or reactivity.</p>
FSUBS	<p>Fuel substitution in units operated in accordance with applicable technical operating requirements in the hazardous waste rules.</p>
HLVIT	<p>Vitrification of high level mixed radioactive wastes in units in compliance with all applicable radioactive protection requirements under control of the nuclear regulatory commission.</p>
IMERC	<p>Incineration of wastes containing organics and mercury in units operated in accordance with the technical operating requirements of rules 3745-57-40 to 3745-57-51 and 3745-68-40 to 3745-68-52 of the Administrative Code. All wastewater and nonwastewater residues derived from this process must then comply with the corresponding treatment standards per EPA hazardous waste number with consideration of any applicable subcategories (e.g., high or low mercury</p>

	subcategories).
INCIN	Incineration in units operated in accordance with the technical operating requirements of rules 3745-57-40 to 3745-57-51 and 3745-68-40 to 3745-68-52 of the Administrative Code.
LLEXT	Liquid-liquid extraction (often referred to as solvent extraction) of organics from liquid wastes into an immiscible solvent for which the hazardous constituents have a greater solvent affinity, resulting in an extract high in organics that must undergo either incineration, reuse as a fuel, or other recovery/reuse and a raffinate (extracted liquid waste) proportionately low in organics that must undergo further treatment as specified in the standard.
MACRO	Macroencapsulation with surface coating materials such as polymeric organics (e.g., resins and plastics) or with a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. Macroencapsulation specifically does not include any material that would be classified as a tank or container as defined in rule 3745-50-10 of the Administrative Code.
NEUTR	Neutralization with the following reagents (or waste reagents) or combinations of reagents: (1) acids; (2) bases; or (3) water (including wastewaters) resulting in a pH greater than 2.0 but less than 12.5 as measured in the aqueous residuals.
NLDBR	No land disposal based on recycling.
POLYM	Formation of complex high-molecular weight solids through polymerization of monomers in high TOC D001 nonwastewaters which are chemical components in the manufacture of plastics.
PRECP	Chemical precipitation of metals and other inorganics as insoluble precipitates of oxides, hydroxides, carbonates, sulfides, sulfates, chlorides, fluorides, or phosphates. The following reagents (or waste reagents) are typically used alone or in combination: (1) lime (i.e., containing oxides and/or hydroxides of calcium and/or magnesium); (2) caustic (i.e., sodium and/or potassium hydroxides); (3) soda ash (i.e., sodium carbonate); (4) sodium sulfide; (5) ferric sulfate or ferric chloride; (6) alum; or (7) sodium sulfate. Additional flocculating, coagulation or similar reagents/processes that enhance sludge dewatering characteristics are not precluded from use.
RBERY	Thermal recovery of beryllium.
RCGAS	Recovery/reuse of compressed gases including techniques such as reprocessing of the gases for reuse/resale; filtering/adsorption of

	impurities; remixing for direct reuse or resale; and use of the gas as a fuel source.
RCORR	Recovery of acids or bases utilizing one or more of the following recovery technologies: (1) distillation (i.e., thermal concentration); (2) ion exchange; (3) resin or solid adsorption; (4) reverse osmosis; and/or (5) incineration for the recovery of acid. Note: This does not preclude the use of other physical phase separation or concentration techniques such as decantation, filtration (including ultrafiltration), and centrifugation, when used in conjunction with the above listed recovery technologies.
RLEAD	Thermal recovery of lead in secondary lead smelters.
RMERC	Retorting or roasting in a thermal processing unit capable of volatilizing mercury and subsequently condensing the volatilized mercury for recovery. The retorting or roasting unit (or facility) must be subject to one or more of the following: (a) a national emissions standard for hazardous air pollutants (NESHAP) for mercury; (b) a best available control technology (BACT) or a lowest achievable emission rate (LAER) standard for mercury imposed pursuant to a prevention of significant deterioration (PSD) permit; or (c) a state permit that establishes emission limitations (within meaning of section Section 302 of the Clean Air Act) for mercury. All wastewater and nonwastewater residues derived from this process must then comply with the corresponding treatment standards per EPA hazardous waste number with consideration of any applicable subcategories (e.g., high or low mercury subcategories).
RMETL	Recovery of metals or inorganics utilizing one or more of the following direct physical/removal technologies: (1) ion exchange; (2) resin or solid (i.e., zeolites) adsorption; (3) reverse osmosis; (4) chelation/solvent extraction; (5) freeze crystallization; (6) ultrafiltration; and/or (7) simple precipitation (i.e., crystallization). Note: This does not preclude the use of other physical phase separation or concentration techniques such as decantation, filtration (including ultrafiltration), and centrifugation, when used in conjunction with the above listed recovery technologies.
RORGS	Recovery of organics utilizing one or more of the following technologies: (1) distillation; (2) thin film evaporation; (3) steam stripping; (4) carbon adsorption; (5) critical fluid extraction; (6) liquid-liquid extraction; (7) precipitation/crystallization (including freeze crystallization); or (8) chemical phase separation techniques (i.e., addition of acids, bases, demulsifiers, or similar chemicals). Note: This does not preclude the use of other physical phase separation techniques such as a decantation, filtration (including ultrafiltration), and centrifugation, when used in conjunction with the above listed recovery

	technologies.
RTHRM	Thermal recovery of metals or inorganics from nonwastewaters in units identified as "industrial furnaces" according to the definition of that term in rule 3745-50-10 of the Administrative Code in the subparagraphs for cement kilns; blast furnaces; smelting, melting, and refining furnaces; combustion devices used in the recovery of sulfur values from spent sulfuric acid; and halogen acid furnaces.
RZINC	Resmelting in high temperature metal recovery units for the purpose of recovery of zinc.
STABL	Stabilization with the following reagents (or waste reagents) or combinations of reagents: (1) portland cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust) - this does not preclude the addition of reagents (e.g., iron salts, silicates, and clays) designed to enhance the set/cure time and/or compressive strength, or to overall reduce the leachability of the metal or inorganic.
SSTRP	Steam stripping of organics from liquid wastes utilizing direct application of steam to the wastes operated such that liquid and vapor flow rates, as well as; temperature and pressure ranges, have been optimized, monitored, and maintained. These operating parameters are dependent upon the design parameters of the unit, such as; the number of separation stages and the internal column design. Thus, thus resulting in a condensed extract high in organics that must undergo either incineration, reuse as a fuel, or other recovery/reuse and an extracted wastewater that must undergo further treatment as specified in the standard.
<u>VDT</u>	<u>Vacuum thermal desorption of low-level radioactive hazardous mixed waste in units in compliance with all applicable radioactive protection requirements under control of the nuclear regulatory commission.</u>
WETOX	Wet air oxidation performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., total organic carbon can often be used as an indicator parameter for the oxidation of many organic constituents that cannot be directly analyzed in wastewater residues).
WTRRX	Controlled reaction with water for highly reactive inorganic or organic chemicals with precautionary controls for protection of workers from potential violent reactions as well as precautionary controls for potential emissions of toxic/ignitable levels of gases released during the reaction.
Notes:	

1 Reserved.

2 When more than one technology (or treatment train) is specified as alternative treatment standards, the five letter technology codes (or the treatment trains) are separated by a semicolon with the last technology preceded by the word "or". This indicates that any one of these BDAT technologies or treatment trains can be used for compliance with the standard.
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- (B) Any person may submit an application to the director demonstrating that an alternative treatment method can achieve a measure of performance equivalent to that achieved by methods specified in paragraphs (A), (C), and (D) of this rule for wastes or specified in ~~table 1 of the table in~~ rule 3745-270-45 of the Administrative Code for hazardous debris. The applicant must submit information demonstrating that his treatment method is in compliance with federal, state, and local requirements and is protective of human health and the environment. On the basis of such information and any other available information, the administrator may approve the use of the alternative treatment method if he finds that the alternative treatment method provides a measure of performance equivalent to that achieved by methods specified in paragraphs (A), (C), and (D) of this rule for wastes or in ~~table 1 of the table in~~ rule 3745-270-45 of the Administrative Code for hazardous debris. Any approval must be stated in writing and may contain such provisions and conditions as the director deems appropriate. The person to whom such approval is issued must comply with all limitations contained in such a determination.
- (C) As an alternative to the otherwise applicable treatment standards in rules 3745-270-40 to 3745-270-49 of the Administrative Code, lab packs are eligible for land disposal provided the following requirements are met:
- (1) The lab packs comply with the applicable provisions of rules 3745-57-16 and 3745-68-16 of the Administrative Code;
 - (2) The lab pack does not contain any of the wastes listed in appendix I to this rule;
 - (3) The lab packs are incinerated in accordance with the requirements of rules 3745-57-40 to 3745-57-51 or 3745-68-40 to 3745-68-52 of the Administrative Code; and
 - (4) Any incinerator residues from lab packs containing D004, D005, D006, D007, D008, D010, and D011 are treated in compliance with the applicable treatment standards specified for such wastes in rules 3745-270-40 to 3745-270-49 of the Administrative Code.
- (D) Radioactive hazardous mixed wastes are subject to the treatment standards in rule

3745-270-40 of the Administrative Code. Where treatment standards are specified for radioactive mixed wastes in the table of treatment standards, those treatment standards will govern. Where there is no specific treatment standard for radioactive mixed waste, the treatment standard for the hazardous waste (as designated by EPA hazardous waste number) applies. Hazardous debris containing radioactive waste is subject to the treatment standards specified in rule 3745-270-45 of the Administrative Code.

~~[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see rule 3745-50-11 of the Administrative Code titled "Incorporated by reference."]~~

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AMENDED APPENDIX

1

Appendix I to rule 3745-270-42 of the Administrative Code

Wastes Excluded from Lab Packs Under the Alternative Treatment Standards
of Paragraph (C) of rule 3745-270-42 of the Administrative Code

Hazardous wastes with the following EPA hazardous waste numbers may not be placed in lab packs under the alternative treatment standards of paragraph (C) of rule 3745-270-42 of the Administrative Code: D009, F019, K003, K004, K005, K006, K062, K071, K100, K106, P010, P011, P012, P076, P078, U134, and U151

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AMENDED APPENDIX

1

Appendix II to rule 3745-270-42 of the Administrative Code

Recommended Technologies to Achieve Deactivation of Characteristics
in rule 3745-270-42 of the Administrative Code

The treatment standard for many characteristic wastes is stated in ~~Table UTS~~ the table in rule 3745-270-40 of the Administrative Code as “Deactivation and meet UTS.” Ohio EPA has determined that many technologies, when used alone or in combination, can achieve the deactivation portion of the treatment standard. Characteristic wastes that are not managed in a facility regulated by the Clean Water Act (CWA) or in a CWA-equivalent facility, and that also contain underlying hazardous constituents (as defined in rule 3745-270-02 of the Administrative Code) must be treated not only by a "deactivating" technology to remove the characteristic, but also to achieve the universal treatment standards (UTS) for underlying hazardous constituents. This appendix presents a partial list of these technologies, utilizing the five-letter technology codes established in ~~Table UTS~~ the table in rule 3745-270-42 of the Administrative Code that may be useful in meeting the treatment standard. Use of these specific technologies is not mandatory and does not preclude direct reuse, recovery, and/or the use of other pretreatment technologies, provided deactivation is achieved and underlying hazardous constituents are treated to achieve the UTS.

EPA hazardous waste number/subcategory		Non-wastewaters	Wastewaters
D001	Ignitable Liquids based on paragraph (A)(1) of rule 3745-51-21 of the Administrative Code- Low TOC Nonwastewater Subcategory (containing 1% to <10% TOC)	RORGS INCIN WETOX CHOXD BIODG	NA
D001	Ignitable Liquids based on paragraph (A)(1) of rule 3745-51-21 of the Administrative Code- Ignitable Wastewater Subcategory (containing <1% TOC)	NA	RORGS INCIN WETOX CHOXD BIODG
D001	Compressed Gases based on paragraph (A)(3) of rule 3745-51-21 of the Administrative Code	RCGAS INCIN FSUBS ADGAS fb INCIN ADGAS fb (CHOXD; or CHRED)	NA
D001	Ignitable Reactives based on paragraph (A)(2) of rule 3745-51-21 of the Administrative Code	WTRRX CHOXD CHRED STABL INCIN	NA
D001	Ignitable Oxidizers based on paragraph (A)(4) of rule 3745-51-21 of the Administrative Code	CHRED INCIN	CHRED INCIN

EPA hazardous waste number/subcategory		Non-wastewaters	Wastewaters
D002	Acid Subcategory based on paragraph (A)(1) of rule 3745-51-22 of the Administrative Code with pH less than or equal to 2	RCORR NEUTR INCIN	NEUTR INCIN
D002	Alkaline Subcategory based on paragraph (A)(1) of rule 3745-51-22 of the Administrative Code with pH greater than or equal to 12.5	NEUTR INCIN	NEUTR INCIN
D002	Other Corrosives based on paragraph (A)(2) of rule 3745-51-22 of the Administrative Code	CHOXD CHRED INCIN STABL	CHOXD CHRED INCIN
D003	Water Reactives based on paragraphs (A)(2), (A)(3), and (A)(4) of rule 3745-51-23 of the Administrative Code	INCIN WTRRX CHOXD CHRED	NA
D003	Reactive Sulfides based on paragraph (A)(5) of rule 3745-51-23 of the Administrative Code	CHOXD CHRED INCIN STABL	CHOXD CHRED BIODG INCIN
D003	Explosives based on paragraphs (A)(6), (A)(7), and (A)(8) of rule 3745-51-23 of the Administrative Code	INCIN CHOXD CHRED	INCIN CHOXD CHRED BIODG CARBN
D003	Other Reactives based on paragraph (A)(1) of rule 3745-51-23 of the Administrative Code	INCIN CHOXD CHRED	INCIN CHOXD CHRED BIODG CARBN
K044	Wastewater treatment sludges from the manufacturing and processing of explosives	CHOXD CHRED INCIN	CHOXD CHRED BIODG CARBN INCIN
K045	Spent carbon from the treatment of wastewaters containing explosives	CHOXD CHRED INCIN	CHOXD CHRED BIODG CARBN INCIN

EPA hazardous waste number/subcategory		Non-wastewaters	Wastewaters
K047	Pink/red water from TNT operations	CHOXD CHRED INCIN	CHOXD CHRED BIODG CARBN INCIN
Note: NA stands for "not applicable"; "fb" stands for "followed by".			

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