

3745-27-72 Scrap tire monofill facility construction.

(A) Applicability. The construction requirements specified in this rule are applicable to the following:

- (1) A scrap tire monofill facility.
- (2) A scrap tire monocell facility as specified in rule 3745-27-69 of the Administrative Code.

(B) [Reserved]

(C) The owner or operator shall comply with the following specifications in the design and construction of the scrap tire monofill or monocell facility. Alternatives for paragraphs (C)(1)(a) to (C)(1)(e) of this rule may be used if it is demonstrated to the satisfaction of the director or his authorized representative that the materials and techniques will result in each lift having a maximum permeability of 1×10^{-6} cm/sec.

(1) A recompacted soil liner shall at a minimum comply with the following:

- (a) Be constructed using loose lifts eight inches thick or less to achieve uniform compaction. Each lift shall have a maximum permeability of one times ten to the minus six centimeters per second (1×10^{-6} cm/sec).
- (b) Be constructed of a soil with a maximum clod size of three inches or half the lift thickness, whichever is less.
- (c) Be constructed of a soil as follows:
 - (i) With one hundred per cent of the particles having a maximum dimension not greater than two inches.
 - (ii) With not more than ten per cent of the particles, by weight, having a dimension greater than 0.75 inches.
 - (iii) With not less than fifty per cent of the particles, by weight, passing through the 200-mesh sieve.
 - (iv) With not less than twenty-five per cent of the particles, by weight, having a maximum dimension not greater than 0.002 millimeters.
- (d) Be compacted to at least ninety-five per cent of the maximum "standard proctor density" using ASTM D698-00a or at least ninety per cent of the maximum "modified proctor density" using ASTM D1557-00.
- (e) Be compacted at a moisture content at or wet of optimum.
- (f) Not be comprised of solid waste.
- (g) Be constructed using the number of passes and lift thickness, and the same or similar type and weight of compaction equipment established by testing required in paragraphs (C)(1)(m) and (C)(1)(n) of this rule.
- (h) Be placed on the bottom and exterior excavated sides of the monofill and have a minimum bottom slope of two per cent and a maximum slope based on the following:
 - (i) Compaction equipment limitations.

- (ii) Slope stability.
- (i) Be constructed on a prepared surface that shall comply with the following:
 - (i) Be free of debris, foreign material, and deleterious material.
 - (ii) Be able to bear the weight of the facility and its construction and operations without causing or allowing a failure of the liner to occur through settling.
 - (iii) Not have any abrupt changes in grade that may result in damage to geosynthetics.
- (j) Be at least one of the following:
 - (i) Three feet thick, unless the director approves an alternate thickness, to be no less than one and one-half feet thick.
 - (ii) One and one-half feet thick with a geosynthetic clay liner that meets the specifications in paragraph (C)(3) of this rule.
 - (iii) Based on a design acceptable to the director that is no less protective of human health and the environment than the designs specified in paragraphs (C)(1)(j)(i) and (C)(1)(j)(ii) of this rule.

[Comment: A flexible membrane liner is not used due to the heat or contact with burning pyrolytic oils from a fire.]
- (k) Have a factor of safety for hydrostatic uplift not less than 1.4.
- (l) Be adequately protected from damage due to desiccation, freeze/thaw cycles, wet/dry cycles, and the intrusion of objects during construction and operation.
- (m) The recompacted soil liner shall be modeled by the construction of test pads. Test pads shall comply with the following:
 - (i) Be designed such that the proposed tests are appropriate and their results are valid.
 - (ii) Be constructed to establish the construction details, or verify or amend the construction details proposed in the approved permit, which are necessary to obtain sufficient compaction to satisfy the permeability requirement. The construction details include such items as the lift thickness, the water content necessary to achieve the desired compaction, and the type, weight, and number of passes of construction equipment.
 - (iii) Be constructed prior to the construction of the scrap tire monofill or monocell facility component which the test pad will model.
 - (iv) Be constructed whenever there is a significant change in soil material properties.
 - (v) Have a minimum width three times the width of compaction equipment, and a minimum length two times the length of compaction equipment, including power equipment and any attachments.
 - (vi) Be comprised of at least four lifts.
 - (vii) Be tested for field permeability, following the completion of test pad construction, using methods acceptable to the director. For each lift, a minimum of three tests for moisture content

and density shall be performed.

- (viii) Be reconstructed as many times as necessary to meet the permeability requirement. Any amended construction details shall be noted for future soil liner or soil barrier layer in alterations section of the construction certification report prepared in accordance with paragraph (H) of this rule.
 - (ix) An alternative to test pads may be used if it is demonstrated to the satisfaction of the director or his authorized representative that the alternative meets the requirements of this paragraph.
 - (n) If test pad results necessitate amended construction details, as outlined in paragraph (C)(1)(m)(viii) of this rule, the amended construction details shall replace the appropriate construction details from the approved permit to install. The scrap tire monofill or monocell facility component which the test pad modeled shall be constructed using the amended construction details. These amendments shall be explicitly outlined in the construction certification report required by paragraph (H) of this rule.
 - (o) Moisture content and density testing of the recompacted soil liner and recompacted soil barrier in the cap system shall be performed at a frequency of no less than five tests per acre per lift. Any penetrations shall be repaired using methods acceptable to the director.
- (2) A flexible membrane liner, placed on the recompacted soil liner, for submergence facilities only, or recompacted soil barrier layer, shall be sixty mil high density polyethylene (HDPE) and meet the requirements in paragraphs (C)(2)(e) and (C)(2)(f) of this rule. Other materials or thicknesses may be used if, at a minimum, the flexible membrane liner meets all the following:
- (a) Be negligibly permeable to fluid migration.
 - (b) Be physically and chemically resistant to chemical attack by the scrap tires, leachate, or other materials which may come in contact with the flexible membrane liner.
 - (c) Be seamed to allow no more than negligible amounts of leakage; the seaming material shall be physically and chemically resistant to chemical attack by the scrap tires, leachate, or other materials which may come in contact with the seams.
 - (d) Have properties for its installation and use which are acceptable to the director.
 - (e) Have a minimum thickness of forty mils.
 - (f) Be tested in accordance with the following, unless the manufacturer's specifications for testing are more stringent than the paragraphs (C)(2)(f)(i) to (C)(2)(f)(iii) of this rule, in which case the manufacturer's specifications shall be used:
 - (i) For the purpose of testing every seaming apparatus in use each day, peel and shear tests shall be performed on scrap pieces of flexible membrane liner at the beginning of the seaming period and every four hours thereafter.
 - (ii) Nondestructive testing shall be performed on one hundred per cent of the flexible membrane liner seams.
 - (iii) Destructive testing for peel and shear shall be performed at least once for every five hundred feet of seam length. An alternate means may be used if it is demonstrated to the satisfaction of the director or his authorized representative that the alternate means meets the requirements of this paragraph.

- (3) A geosynthetic clay liner shall have the following characteristics:
- (a) Be negligibly permeable to fluid migration.
 - (b) Be installed to allow no more than negligible amounts of leakage by a minimum overlap of six inches, or, for end-of-panel seams, a minimum overlap of twelve inches. Overlap shall be increased in accordance with manufacture's specifications or to account for shrinkage due to weather conditions.
 - (c) Have a bentonite mass per unit area of at least one pound per square foot.
 - (d) Be installed in accordance with the manufacture's specifications in regards to handling, overlap, and the use of granular or powdered bentonite to enhance bonding at the seams.
 - (e) In the case of geosynthetic clay liner used in lieu of a portion of the recompacted soil barrier layer pursuant to paragraph (C)(9) of this rule, the geosynthetic clay liner shall be constructed on an engineered subgrade that meets the following specifications:
 - (i) The thickness of the subgrade shall be sufficient to achieve an evenly graded surface and shall be a minimum of twelve inches.
 - (ii) Paragraphs (C)(1)(c)(i) and (C)(1)(c)(iv) of this rule (particle size).
 - (iii) Paragraph (C)(1)(d) of this rule (proctor density).
 - (iv) After being smooth-rolled, the surface shall not have sharp edged or protruding particles.
 - (v) The particle size and proctor density required by this paragraph shall be verified by tests performed on representative samples based on the variability and homogeneity of the material, but no less than a minimum of once for every five thousand cubic yards of material used in the engineered subgrade.
 - (vi) Field density testing in accordance with paragraph (C)(1)(o) of this rule at a frequency not less than five tests per acre. Any penetrations in the subgrade as a result of the testing must be repaired using bentonite or a bentonite-soil mixture.
- (4) A leachate management system shall be designed to prevent clogging and crushing of the system, and shall, at a minimum, consist of the following:
- (a) A drainage layer placed on top of the liner that is able to rapidly collect leachate entering the system. The granular material shall comply with the following:
 - (i) Have a minimum permeability of one times ten to the minus three centimeters per second (1×10^{-3} cm/sec).
 - (ii) Have a minimum thickness of one foot.
 - (iii) Have a negligible amount of fines.
 - (iv) Not contain more than five per cent carbonate material.
 - (v) The drainage layer shall not consist of scrap tires if a geosynthetic clay liner is used in the liner of the monofill or monocell facility.

An alternate material and/or thickness may be used if it is demonstrated to the satisfaction of the

director or his authorized representative that the material meets the requirements of this paragraph.

- (b) A means to remove leachate from the bottom of the facility. Leachate collection shall comply with the following:
- (i) Be designed to collect leachate within the limits of waste placement.
 - (ii) Be designed to be capable of maintaining less than a one foot depth of leachate over the liner, excluding the leachate sump collection point(s).
 - (iii) Have a minimum slope of 2.0 per cent.
 - (iv) Have lengths and configuration which shall not exceed the capabilities of clean-out devices.
 - (v) Be provided with access for clean-out devices, as required by the director, which shall be protected from differential settling.

An alternative means for leachate removal may be used if it is demonstrated to the satisfaction of the director or his authorized representative that the means for leachate removal meets the requirements of this paragraph.

- (c) A filter layer, to prevent clogging of the leachate collection system.
- (d) A protective layer to protect the recompacted soil liner and leachate collection system from damage due to dessication, freeze/thaw cycles, wet/dry cycles, and the intrusion of objects during construction and operation.
- (e) Lift stations which are to be protected from adverse effects from leachate and differential settling. If manholes are used as lift stations, they shall be equipped with automatic high level alarms located no greater than six feet above the invert of the leachate inlet pipe. Lift station pumps shall be of adequate capacity and shall automatically commence pumping before the leachate elevation activates the high level alarm or if a gravity drainage system is used it shall be of adequate capacity to meet the requirements of paragraph (C)(4)(b) of this rule.
- (5) Any leachate conveyance and storage structures located outside of the limits of scrap tire placement shall be no less protective of the environment than the scrap tire monofill facility, as determined by the director, and shall comply with the following:
- (a) Be monitored, as required by the director.
 - (b) For storage structures, have a minimum of one week of storage capacity using design assumptions simulating final closure completed in accordance with rule 3745-27-73 of the Administrative Code.
 - (c) If, at any time, leachate is evaluated to be hazardous in accordance with rule 3745-52-11 of the Administrative Code, it shall be managed in accordance with Chapters 3745-50 to 3745-69 of the Administrative Code, and the generator standards for storage shall apply in accordance with Chapter 3745-52 of the Administrative Code.
- (6) Any permanent or temporary surface water control structures shall, at a minimum, be designed to accommodate, by non-mechanical means, the peak flow from the twenty-five year/twenty-four hour storm event and to minimize silting and scouring.
- (7) At least three permanent survey marks on separate sides of the scrap tire monofill or monocell facility

shall be within easy access to the limits of waste placement in accordance with the following:

- (a) Survey marks shall be referenced horizontally to the "1927 North American Datum, 1983 North American Datum, or State Plane Coordinate System and vertically to the 1929 or 1988 North American Vertical Sea Level Datum" as identified on the 7.5 minute series quadrangle sheets published by the United States geological survey.
- (b) Survey marks shall be at least as stable as a poured concrete monument ten inches in diameter installed to a depth of forty-two inches below the ground surface. Each constructed survey mark shall include a corrosion resistant metallic disk which indicates horizontal and vertical coordinates of the survey mark and shall contain a magnet or ferromagnetic rod to allow identification through magnetic detection methods.
- (c) Survey control standards for the survey marks shall be in accordance with the following:
 - (i) For the first facility survey mark established from the known control point, minimum horizontal distance accuracy shall be one foot horizontal to two thousand five hundred feet horizontal.
 - (ii) For each facility survey mark established from the first facility survey mark, minimum horizontal accuracy shall be one foot horizontal distance to five thousand feet horizontal.
 - (iii) For the first facility survey mark established from the known control point and for each facility survey mark established from the first facility survey mark, minimum vertical accuracy shall be one inch to five thousand feet horizontal.
- (8) Grades of access roads shall not exceed twelve per cent. All access roads shall be designed to allow passage of loaded vehicles during all weather conditions with minimum erosion and dust generation and with adequate drainage.
- (9) A cap system in all areas of scrap tire placement, as specified in paragraph (G) of rule 3745-27-73 of the Administrative Code, which shall minimize infiltration and shall, at a minimum, consist of the following components:
 - (a) A geotextile fabric.
 - (b) A recompacted soil barrier layer, a minimum of sixty inches thick constructed in accordance with the specifications in paragraphs (C)(1)(a) to (C)(1)(f) and (C)(1)(o) of this rule; or
 - (c) A geosynthetic clay liner of equal or less permeability as the recompacted soil barrier layer, with an eighteen inch engineered subgrade, constructed in accordance with paragraph (C)(3)(e) of this rule; or
 - (d) A flexible membrane liner constructed in accordance with the specifications in paragraph (C)(2) of this rule, on top of an eighteen inch engineered subgrade or geosynthetic clay liner.
 - (e) A drainage layer shall be used when constructing the barrier layer with either the flexible membrane liner or geosynthetic clay liner, that is either of the following:
 - (i) A minimum of twelve inches of granular material, constructed in accordance with the specifications in paragraph (C)(4)(a) of this rule.
 - (ii) A drainage net that has equivalent performance capabilities as the granular material constructed in accordance with paragraph (C)(4)(a) of this rule.

- (f) A frost protection layer placed on top of the drainage layer. The frost protection layer shall be a minimum of thirty-six inches thick for facilities in the northern tier of counties in Ohio (Williams, Fulton, Lucas, Ottawa, Erie, Lorain, Cuyahoga, Lake, Geauga, and Ashtabula counties) and thirty inches thick for facilities elsewhere in Ohio.
 - (g) A vegetative layer, consisting of soil and vegetation, placed on top of the frost protection layer. The soil shall be of sufficient thickness and fertility to support its vegetation and to protect the recompacted soil barrier layer and flexible membrane liner from damage due to root penetration. Soil from the frost protection layer may be used as a part of the vegetative layer. Healthy grasses or other vegetation shall form a complete and dense vegetative cover.
 - (h) The cap system shall have a maximum projected erosion rate of five tons per acre per year and shall have the slopes and the final elevations specified in the permit to install for the scrap tire monofill facility.
 - (i) Any penetrations into the cap system shall be sealed so that the integrity of the recompacted soil barrier layer is maintained.
 - (j) Comparable materials and/or thicknesses for the soil barrier layer, the granular drainage layer, and the soil vegetative layer may be used if approved by the director.
- (D) Material specifications. Prior to being used in the construction of the recompacted soil liner and drainage layer and the recompacted soil barrier layer and the drainage layer in paragraph (C) of this rule, the following characteristics of the earthen materials shall be determined to show that the material is suitable for use in construction of the scrap tire monofill or monocell facility:
- (1) For the soil material, all of the following:
 - (a) Recompacted permeability at construction specifications.
 - (b) Moisture content and density using an approved ASTM method.
 - (c) Grain size distribution using ASTM D422-63 for sieve and hydrometer methods.
 - (d) Atterberg limits using ASTM D4318-00.

Each of the above tests shall be performed on representative samples at least once for every one thousand five hundred cubic yards of soil, except the test outlined in paragraph (D)(1)(a) of this rule, which shall be performed at least once for every ten thousand cubic yards of soil; and
 - (2) For the granular drainage material to be tested at least once for every three thousand cubic yards of material for the following:
 - (a) Permeability.
 - (b) Grain size distribution using ASTM D422-63 for the sieve method.
 - (3) Chemical compatibility testing may be required by the director.

At the request of the health commissioner of an approved health department or the director, or their authorized representatives, results of testing required in this paragraph shall be made available for inspection. Upon submission of a certification report in accordance with paragraph (D) of rule 3745-27-75 of the Administrative Code, the owner or operator shall include the results of testing in the certification report.

- (E) Prior to the installation of the geosynthetics, other synthetic materials, and joint sealing compounds used in the construction of the flexible membrane liner (for a submergence facility only), geosynthetic clay liner, and leachate management system in paragraph (C) of this rule, these materials shall comply with the following:
- (1) Be shown to be physically and chemically resistant to attack by the scrap tires, leachate, or other materials that they may come in contact with, using USEPA Method 9090 or other documented data; and
 - (2) Be shown to have properties acceptable for installation and use.
- (F) Quality assurance/quality control. The owner or operator of a scrap tire monofill facility shall demonstrate in a "quality assurance/quality control plan" that the construction of the scrap tire monofill facility will be in accordance with the applicable authorizing document(s) including an approved permit(s) to install. The quality assurance/quality control plan shall include all applicable components and applicable test methods specified in paragraphs (F)(1) and (F)(2) of this rule.
- (1) The following components shall be included in a quality assurance/quality control plan:
 - (a) In-situ foundation preparation.
 - (b) Recompacted soil liner.
 - (c) Flexible membrane liner (for a submergence facility only).
 - (d) Leachate management system.
 - (e) Cap system.
 - (f) Geotextile fabric.
 - (g) Geosynthetic clay liner.
 - (2) The following testing procedures shall be included in a quality assurance/quality control plan:
 - (a) Sampling and testing procedures to be used in the field and in the laboratory.
 - (b) Testing frequency.
 - (c) Parameters and sample locations.
 - (d) Procedures to be followed if a test fails.
 - (e) The management structure and the experience and training of the testing personnel.
 - (f) Contingency plan if construction difficulties are anticipated.
- (G) All tests failing to meet the specifications outlined in this rule must be investigated. An area with a verified failure must be reconstructed to meet specifications. Reconstructed areas shall be retested at a frequency acceptable to the director. Reconstruction and retesting shall be performed in accordance with paragraph (D) of rule 3745-27-75 of the Administrative Code.
- (H) Construction certification report. Pursuant to paragraphs (D) of rule 3745-27-75 of the Administrative Code and paragraph (J) of rule 3745-27-73 of the Administrative Code, a certification report shall be prepared by a professional skilled in the appropriate discipline(s) and submitted to the Ohio EPA and to the approved health department. The certification report shall include the following:

- (1) Results of all testing required by this rule, by the quality assurance/quality control plan, and paragraph (F)(2) of this rule. However, if a quality assurance/quality control plan is not required by the applicable authorizing document(s) including an approved permit(s) to install, the owner or operator shall include the results of testing performed, testing procedures, sampling frequency and location, parameters tested for, etc., performed to certify compliance.
- (2) Any alterations and all other changes are to be presented as follows:
 - (a) A listing of all alterations previously concurred with by Ohio EPA and a copy of all concurrence letters.
 - (b) All alteration requests and supporting documentation which are proposed by the owner or operator for concurrence with the construction certification report.

[Comment: Paragraph (D) of rule 3745-27-75 of the Administrative Code requires that the owner or operator obtain Ohio EPA's written concurrence with the certification report prior to placing scrap tires in the phase.]
 - (c) A list of any other changes made by the owner or operator which do not require Ohio EPA concurrence but which affect construction or the record drawing.

[Comment: The listing of these changes is for Ohio EPA's informational purposes only.]
- (3) Record drawings of the constructed facility components showing the following:
 - (a) Plan views showing the grades of the following, as appropriate:
 - (i) The limits of excavation.
 - (ii) The bottom of the recompacted soil liner or barrier layer.
 - (iii) The top of the recompacted soil liner or barrier layer.
 - (iv) The configuration of the leachate management system and the top of the drainage layer.
 - (v) The limits of emplaced waste.
 - (vi) The top of the cap system.
 - (vii) The surface water management system.
 - (b) Plan views of the deployment of the flexible membrane liner panels and the locations of and identification of the destructive tests.
 - (c) Cross sections of the phase(s) at closure showing the following items. The cross sections shall be taken at the same locations and using the same scale as in the approved permit to install. Otherwise, the cross sections shall be taken at an interval no greater than every three hundred feet of length and width:
 - (i) The limits of excavation.
 - (ii) The limits of emplaced waste.
 - (iii) Final grade including the cap system (not applicable to submergence facilities).

- (d) Necessary details.
- (4) After the initial construction and establishment of facility survey marks, the following information summarizing the activities performed to construct and establish the facility survey marks:
 - (a) An identification and description of the known control point(s) used to establish the horizontal and vertical coordinate(s) of the facility survey marks.
 - (b) The horizontal and vertical coordinates of the known control point(s) and facility survey marks.
 - (c) A summary of surveying activities performed in determining the coordinates of the facility survey marks.
 - (d) A copy of the 7.5 minute series quadrangle sheet(s) used in establishing the survey marks with the known control point(s) and the location of the facility survey marks clearly identified.
 - (e) A detailed drawing(s) illustrating the design of the facility survey marks, as constructed.
- (5) A notarized statement that, to the best of the knowledge of the owner or operator, the certification report is true, accurate, and contains all information required by paragraph (F) of this rule.
- (I) Submergence facilities. The owner or operator of a scrap tire submergence facility shall comply with the construction requirements specified in this rule except that the following are not applicable to a scrap tire submergence facility;
 - (1) Paragraph (C)(4) of this rule.
 - (2) Paragraph (C)(5) of this rule.
 - (3) Paragraph (C)(9) of this rule.
 - (4) Paragraphs (F)(1)(d) and (F)(1)(e) of this rule.
 - (5) Paragraphs (H)(3)(a)(iv) and (H)(3)(a)(v) and (H)(3)(c)(iii) of this rule.

Alternatives to the construction requirements in paragraph (C) of this rule may be used if it is demonstrated to the satisfaction of the director or his authorized representative that the alternative provides equivalent protection of human health, safety, and the environment.

Five Year Review (FYR) Dates: 04/23/2014 and 04/23/2019

CERTIFIED ELECTRONICALLY

Certification

04/23/2014

Date

Promulgated Under: 119.03
Statutory Authority: 3734.02, 3734.12, 3734.72
Rule Amplifies: 3734.02, 3734.12, 3734.72, 3734.77
Prior Effective Dates: 3/1/1996, 8/15/2003