Ohio Administrative Code

Rule 3745-580-705 Construction of a scrap tire monofill facility.

Effective: June 30, 2023

This rule identifies the engineered components of ascrap tire monofill facility, design specifications, and construction andreporting requirements.

(A) The owner or operator shall contact the approved board of health and Ohio EPA prior to commencing construction of each phase of the scrap tire monofill facility for the purpose of inspection.

(B) The owner or operator shall design and construct the scrap tire monofill facility as follows:

(1) The foundation or added geologic material used to meet the isolation distance between the uppermost aquifer system and the bottom of the liner system complies with the following:

(a) Is free of debris, foreign material, deleterious material, and shall not contain large objects in such quantities as may interfere with its application and intended purpose.

(b) Is not comprised of solid waste.

(c) Is determined to have adequate strength to satisfy bearing capacity and slope stability strength requirements.

(d) Is resistant to internal erosion.

(e) For foundation, has quality control testing for resistance to internal erosion of any stratigraphic units that have not been anticipated and that are more susceptible to seepage piping failure than the stratigraphic units that were tested and reported in the permit to install in accordance with ASTM D4647.

(f) For added geologic material, is constructed in lifts to achieve uniform compaction that comply

with the following:

(i) Be constructed in loose lifts of twelve inches or less.

(ii) Be constructed of a soil with a maximum clod size that does not exceed the lift thickness.

(iii) Be compacted to at least ninety-five per cent of the maximum dry density determined in accordance with ASTM D698 or at least ninety per cent of the maximum dry density determined in accordance with ASTM D1557.

(iv) Be placed with a soil moisture content that is not less than two per cent below or more than four per cent above the optimum moisture content determined in accordance with ASTM D698 or ASTM D1557.

(v) Have a maximum permeability of 1×10^{-5} cm/sec determined in accordance with ASTM D5084 or other method acceptable to Ohio EPA at a frequency of no less than one test per acre per lift. The locations of the individual tests shall be adequately spaced to represent the constructed area and any penetrations repaired. This paragraph does not apply if the soil is classified as a "CL" in accordance with ASTM D2487.

(vi) Be classified as slightly dispersive (ND3) or nondispersive (ND2, ND1) determined in accordance with ASTM D4647.

(g) For added geologic material, have quality control testing of the constructed lifts performed to determine the density and moisture content in accordance with ASTM D6938, ASTM D1556, ASTM D2167 or other methods acceptable to Ohio EPA at a frequency of no less than five tests per acre per lift. The locations of the individual tests shall be adequately spaced to represent the constructed area and any penetrations repaired using bentonite.

(2) Structural fill, including rock fill or soil fill, used as a structural berm or subbase complies with the following:

(a) For rock fill, be durable rock.

(b) Be free of debris, foreign material, and deleterious material.

(c) Not be comprised of solid waste.

(d) Not have any abrupt changes in grade that may result in damage to the liner system.

(e) For soil fill, have pre-construction testing of the borrow soils performed on representative samples to determine the maximum dry density and optimum moisture content in accordance with ASTM D698 or ASTM D1557 at a frequency of no less than once for every ten thousand cubic yards.

(f) Be constructed in lifts to achieve uniform compaction of soil fills that comply with the following:

(i) Be constructed in loose lifts of twelve inches or less.

(ii) Be compacted to at least ninety-five per cent of the maximum dry density determined in accordance with ASTM D698 or at least ninety per cent of the maximum dry density determined in accordance with ASTM D1557.

(g) Be determined to have adequate strength to satisfy bearing capacity and slope stability strength requirements.

(h) Have quality control testing of the soil fills on the constructed lifts performed to determine the density and moisture content in accordance with ASTM D6938, ASTM D1556, ASTM D2167 or other methods acceptable to Ohio EPA at a frequency of no less than five tests per acre per lift with locations of the individual tests adequately spaced to represent the constructed area.

(3) The liner system is designed as follows:

(a) For new facilities or lateral expansions of existing facilities, with at least a 2.0 per cent slope in all areas except along flow lines augmented by leachate collection pipes, after accounting for one hundred per cent of the primary consolidation settlement and the secondary consolidation settlement of the compressible materials beneath the facility. Compressible materials include, as applicable, in-

situ soil, added geologic material, structural fill material, and recompacted soil liner. For the purposes of this paragraph, secondary settlement is calculated using a one hundred year time frame or another time frame acceptable to Ohio EPA.

(b) For existing facilities where an owner or operator proposes to vertically expand over a liner system that was constructed after December 31, 2003, the slope of the existing liner system located beneath the vertical expansion meets the design standard in paragraph (B)(3)(a) of this rule.

(c) For existing facilities where an owner or operator proposes to vertically expand over a liner system that was constructed before December 31, 2003, a demonstration that the existing liner system located beneath the vertical expansion at a minimum maintains positive drainage in the leachate collection system and has no more than one foot of head of leachate after accounting for the additional waste and one hundred percent of the primary consolidation settlement and the secondary consolidation settlement of the compressible materials beneath the facility. Compressible materials include, as applicable, in-situ soil, added geologic material, structural fill material, and recompacted soil liner. For the purposes of this paragraph, secondary settlement is calculated using a one hundred year time frame or another time frame acceptable to Ohio EPA.

(4) With a recompacted soil liner that at a minimum complies with the following:

(a) Be constructed using loose lifts eight inches thick or less to achieve uniform compaction, with each lift having a maximum permeability of 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 that meets the following:

(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 a classification of slightly dispersive (ND3) or nondispersive (ND2, ND1) as determined in accordance with ASTM D4647.

(iv) With either of the following:

(a) Not less than twenty-five per cent of the particles, by weight, having a maximum dimension not greater than 0.002 millimeters.

(b) A recompacted laboratory permeability of 1 x 10^{-7} cm/sec in accordance with ASTM D5084 at a frequency of no less than once for every ten thousand cubic yards.

(d) Be compacted to at least ninety-five per cent of the maximum "standard proctor density" in accordance with ASTM D698 or at least ninety per cent of the maximum "modified proctor density" in accordance with ASTM D1557.

(e) Be compacted at a moisture content at or wet of optimum.

(f) Alternatives for paragraphs (B)(4)(a) to (B)(4)(e) of this rule may be used if it is demonstrated to the satisfaction of Ohio EPA that the materials and techniques will result in each lift having a maximum permeability of 1 x 10^{-6} cm/sec.

(g) Not be comprised of solid waste.

(h) Be constructed using the number of passes and lift thickness, and the same or similar type and weight of compaction equipment established by testing specified in paragraphs (B)(4)(m) and (B)(4)(n) of this rule.

(i) 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.

(iii) Maximum friction angle between any soil-geosynthetic interface and between any geosynthetic-geosynthetic interface.

(iv) Resistance of geosynthetic and geosynthetic seams to tensile forces.

(j) Be constructed on a prepared surface that complies with the following:

(i) Be free of debris, foreign material, and deleterious material.

(ii) Be capable of bearing 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.

(k) 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 (B)(5) 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 (B)(4)(k)(i) and (B)(4)(k)(ii) of this rule. Except for a submergence facility, a flexible membrane liner shall not be used due to the heat or contact with burning pyrolitic oils from a fire.

(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) Is modeled by the construction of a test pad that complies with the following unless an alternative

capable of ensuring the recompacted soil liner meets the requirements of this paragraph is demonstrated to the satisfaction of Ohio EPA:

(i) Be designed such that the proposed tests are appropriate and their results are valid.

(ii) Be constructed to establish the construction details that 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 recompacted soil liner 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 Ohio EPA. 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 construction.

(n) For the recompacted soil liner test pad, is described in a certification report that is signed and sealed by a professional engineer registered in the state of Ohio and contains a narrative that proposes the construction details, the range of soil properties that will be used to construct the recompacted soil liner, and the results of all the testing specified in this paragraph. The report shall be submitted to the appropriate Ohio EPA district office for written concurrence not later than fourteen days prior to the intended construction of the recompacted soil liner that will be modeled by the test pad.

(o) Moisture content and density testing of the recompacted soil liner performed in accordance with ASTM D6938, ASTM D1556, ASTM D2167, or other methods acceptable to Ohio EPA at a frequency of no less than five tests per acre per lift with any penetrations repaired using bentonite or using methods acceptable to Ohio EPA.

(5) Geosynthetic clay liner that complies with the following:

(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 manufacturer's specifications or to account for shrinkage due to weather conditions.

(c) Have a dry bentonite mass per unit area of at least 0.75 pounds per square foot at zero percent moisture content.

(d) Be installed in accordance with the manufacturer's specifications in regard to handling, overlap, and the use of granular or powdered bentonite to enhance bonding at the seams.

(6) The leachate management system that complies with the following:

(a) Be designed to avoid clogging and crushing.

(b) Include a drainage layer placed on top of the liner that is able to rapidly collect leachate entering the system. A geocomposite may be used if it is demonstrated to Ohio EPA that the material meets the requirements of this paragraph. Granular material shall comply with the following:

(i) Have a minimum permeability of 1×10^{-2} cm/sec.

(ii) Have a minimum thickness of one foot.

(c) Include a means to automatically 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.

(iii) Have a minimum slope of 2.0 per cent.

(iv) Have lengths and configuration that do not exceed the capabilities of clean-out devices.

(v) Be provided with access for clean-out devices, as specified by the director, that are 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.

(vi) Any lift stations are protected from adverse effects from leachate and differential settling. Lift stations 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 automatically commence pumping before the leachate elevation activates the high level alarm or if a gravity drainage system is used, be of adequate capacity to meet the requirements of paragraph (B)(6)(c) of this rule.

(d) Include a filter layer, to prevent clogging of the leachate collection system.

(e) Include 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.

(f) Any leachate conveyance and storage structures located outside of the limits of scrap tire placement are no less protective of the environment than the scrap tire monofill facility, as determined by Ohio EPA, and complies with the following:

(i) Be monitored, as specified by Ohio EPA.

(ii) For storage structures, have a minimum of one week of storage capacity using design assumptions simulating final closure completed in accordance with rule 3745-580-725 of the Administrative Code.

(iii) For storage tanks, be provided with spill containment.

(iv) If, at any time, leachate is evaluated to be hazardous in accordance with rule 3745-52-11 of the Administrative Code, it is managed in accordance with Chapters 3745-50 to 3745-69 of the Administrative Code, and the generator standards for storage in accordance with Chapter 3745-52 of the Administrative Code.

(g) Treat and dispose of leachate in accordance with one of the following:

(i) At the facility.

(ii) Through on-site pretreatment and either transported or piped off-site for final treatment and disposal.

(iii) Through transportation or piping off-site for treatment and disposal.

(7) Ground water control structures that comply with the following:

(a) Permanent ground water control structures that adequately control ground water infiltration through the use of non-mechanical means such as impermeable barriers or permeable drainage structures. The owner or operator shall not use permanent ground water control structures to dewater an aquifer system, except if the recharge and discharge zone of the aquifer system are located entirely within the boundary of the scrap tire monofill.

(b) For purposes of controlling ground water infiltration until sufficient load has been placed in all locations across the facility such that a 1.40 factor of safety for hydrostatic uplift is achieved, a

pumping system of a temporary ground water control structure that meets the following:

(i) Includes a high-level alarm set at an elevation no higher than the base of the recompacted soil liner being protected by the temporary ground water control structure.

(ii) In the event of a power failure, be supplied with power not later than one hour after the power failure occurring.

(iii) In the event of a pump failure, be supplied with a replacement pump not later than twelve hours after a pump failure occurring.

(8) Surface water control structures that comply with the following:

(a) Any permanent or temporary surface water control structures that at a minimum are 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.

(b) Any sedimentation ponds that are designed and constructed in accordance with the following:

(i) With a minimum storage volume based on either the calculated runoff volume from a ten year, twenty-four hour storm event, or 0.125 acre-feet per year, for each acre of disturbed area within the upstream drainage area, multiplied by the scheduled frequency of pond clean-out (in years), whichever is greater.

(ii) To ensure the principal spillway safely discharges the flow from a ten year, twenty-four hour storm event, the inlet elevation of the emergency spillway is designed to provide flood storage, with no flow entering the emergency spillway, for a twenty-five year, twenty-four hour storm event, with allowance provided for the flow passed by the principal spillway during the event.

(iii) To ensure the combination of principal and emergency spillways safely discharges the flow from a one hundred year, twenty-four hour storm event, the embankment design provides for no less than one foot net freeboard when flow is at the design depth, after allowance for embankment settlement.

(9) Survey mark. With at least one permanent survey mark established prior to any construction and within easy access to the limits of scrap tire placement in accordance with the following:

(a) Referenced horizontally to the 1983 North American datum, or state plane coordinate system and vertically to the 1988 North American vertical sea level datum as identified by the national geodetic survey.

(b) 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. The survey mark shall include a corrosion resistant metallic disk that indicates horizontal and vertical coordinates of the survey mark and contain a magnet or ferromagnetic rod to allow identification through magnetic detection methods.

(c) Survey control standards for the survey mark are in accordance with the following:

(i) The minimum horizontal distance accuracy is one foot horizontal to two thousand five hundred feet horizontal.

(ii) The minimum vertical accuracy is one inch to five thousand feet horizontal.

(10) Grades of access roads that do not exceed twelve per cent and are designed to allow passage of loaded vehicles during all weather conditions with minimum erosion, dust generation, and with adequate drainage.

(11) The cap system that complies with the following:

(a) Minimize infiltration.

(b) Include a geotextile fabric placed on top of the scrap tires.

(c) Include a barrier layer placed on top of the geotextile fabric consisting of one of the following:

(i) A recompacted soil barrier layer, a minimum of sixty inches thick constructed in accordance with

the specifications in paragraphs (B)(4)(a) to (B)(4)(e), (B)(4)(g), and (B)(4)(o) of this rule.

(ii) A geosynthetic clay liner constructed in accordance with the specifications in paragraph (B)(5) of this rule, placed on top of an eighteen inch engineered subgrade.

(iii) A flexible membrane liner constructed in accordance with the specifications of in paragraph (I)(3) of this rule, placed on top of an eighteen inch engineered subgrade or geosynthetic clay liner.

(d) Include a drainage layer placed on top of a flexible membrane liner or geosynthetic clay liner, that is either of the following:

(i) Consist of granular drainage material a minimum of one foot thick with a permeability of 1 x 10^{-3} cm/s. The granular cap drainage layer shall not be placed over wrinkles in the flexible membrane liner that are greater than four inches in height.

(ii) Consist of geocomposite drainage layer with a minimum transmissivity to ensure that the cap system meets the slope stability requirements of this rule. The transmissivity shall be adjusted for elastic deformation, creep deformation, biological clogging, and chemical clogging by using the appropriate reduction factors.

(e) Include a cap protection layer placed above the drainage layer consisting of soil, a minimum of twenty-four inches thick, constructed with soil that meets one of the following:

(i) Is classified as a "CL" in accordance with ASTM D2487.

(ii) Has a maximum permeability of 1 x 10^{-5} cm/sec determined in accordance with ASTM D5084 or other method acceptable to Ohio EPA at a frequency of no less than one test per five acres. The locations of the individual tests shall be adequately spaced to represent the constructed area with any penetrations repaired.

[Comment: The minimum cap protection layer requirement may include six inches of vegetative layer.]

(f) Include a vegetative layer, consisting of soil and vegetation, as the surface of the cap system, that meets the following:

(i) 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. The vegetative layer shall be constructed in a manner that healthy grasses or other vegetation can form a complete and dense vegetative cover not later than one year after placement.

(ii) Have the slopes and the final elevations specified in the permit to install for the facility.

(iii) Have a maximum projected erosion rate of five tons per acre per year.

(iv) Be constructed with best management practices for erosion control.

(g) Any penetrations into the cap system are sealed so that the integrity of the recompacted soil barrier layer is maintained.

(h) Comparable materials or thicknesses for the soil barrier layer, the granular drainage layer, and the soil vegetative layer may be used if it is demonstrated to Ohio EPA that the alternative meets the requirements of this paragraph.

(12) Engineered subgrade that complies with the following:

(a) Be free of solid waste, debris, foreign material, deleterious material, and not contain large objects in such quantities as may interfere with its application and intended purpose. The surface shall not have sharp edged or protruding particles.

(b) Be determined to have adequate strength to satisfy bearing capacity and slope stability strength requirements.

(c) Not have any abrupt changes in grade that may result in damage to the geosynthetic clay liner or flexible membrane liner.

(13) The design for the stability of all engineered components and the waste mass addresses any configuration throughout the applicable development and post-closure care periods. Potential failures associated with internal, interim, and final slopes as these slopes are depicted in the permit to install application, shall be used to define the minimum construction specifications and materials that at a minimum meet the following:

(a) Have a factor of safety for hydrostatic uplift of not less than 1.40 at any location during the construction and operation of the facility.

(b) Have a factor of safety for bearing capacity of any vertical sump risers on the liner system of not less than 3.0.

(c) Have a factor of safety for static slope stability of not less than 1.50 using two dimensional limit equilibrium methods or another factor of safety using a method acceptable to Ohio EPA when assessed for any of the following failure modes and conditions:

(i) Deep-seated translational and deep-seated rotational failure mechanisms of internal slopes, interim slopes, and final slopes for drained conditions. For slopes containing geosynthetic interfaces placed at grades greater than 5.0 per cent, large displacement shear strength conditions shall be used for any soil to geosynthetic or geosynthetic to geosynthetic interfaces.

[Comment: Ohio EPA considers any failure that occurs through a material or along an interface that is loaded with more than one thousand four hundred forty pounds per square foot to be a deep seated failure mode.]

(ii) Shallow translational and shallow rotational failure mechanisms of internal slopes and final slopes for drained conditions.

[Comment: Peak shear strengths can be used for most shallow failure modes.]

(d) Have a factor of safety for static slope stability of not less than 1.30 using two dimensional limit equilibrium methods or another factor of safety using a method acceptable to Ohio EPA when assessed for deep seated translational and deep seated rotational failure mechanisms of internal slopes,

interim slopes, and final slopes for undrained conditions resulting from loading or unloading of the slopes. The analysis shall assume that the weight of the material is loaded or unloaded all at one time without time for pore pressure dissipation or, if the facility is designed using staged loading calculations, then the analysis assumes that the weight of the material is loaded or unloaded all at one time at the end of the time it takes to construct the stage.

(e) Include calculations for seismic slope deformation that demonstrate deformations in the cap system are limited to thirty centimeters and deformations in the bottom liner are limited to fifteen centimeters when assessed for any of the following failure modes and conditions:

(i) Deep-seated translational and deep-seated rotational failure mechanisms of final slopes for drained conditions and as applicable conditions representing the presence of excess pore water pressure at the onset of loading or unloading. For slopes containing geosynthetic interfaces, large displacement shear strength conditions shall be used for any soil to geosynthetic or geosynthetic to geosynthetic interfaces.

(ii) Shallow translational and shallow rotational failure mechanisms of final slopes for unsaturated conditions. For slopes containing geosynthetic interfaces, large displacement shear strength conditions shall be used for any soil to geosynthetic or geosynthetic to geosynthetic interfaces.

(f) Have a factor of safety against liquefaction of not less than 1.00 for internal slopes, interim slopes and final slopes.

(g) Have a factor of safety for static slope stability of not less than 1.10 using two dimensional limit equilibrium methods or other methods acceptable to Ohio EPA when assessed for any of the following failure modes and conditions:

(i) If specified by Ohio EPA, shallow translational and shallow rotational failure mechanisms of internal slopes in which the protective soils over the leachate collection layer have reached field capacity with calculations using the maximum head predicted for the fifty year, one hour design storm.

(ii) Shallow translational and shallow rotational failure mechanisms of final slopes in which the

cover soils over the drainage layer have reached field capacity with calculations using the maximum head predicted for the one hundred year, one hour design storm.

(h) The design of any geosynthetic materials specified as an engineered component, including but not limited to, flexible membrane liner, and geosynthetic clay liner, shall not rely on any of the tensile qualities of the geosynthetic component.

(C) Material suitability testing. The results of the following tests shall meet all applicable specifications in this rule and the set of approved parameters in the permit to install application that were established by the slope stability analysis, be evaluated and signed and sealed by a professional engineer registered in the state of Ohio, and be submitted to the appropriate Ohio EPA district office not later than seven days prior to the intended use of the materials in the construction of the scrap tire monofill facility:

(1) For the soil material used in construction of the recompacted soil liner and cap soil barrier layer, all of the following performed on representative samples:

(a) Recompacted permeability at construction specifications at a frequency of no less than once for every ten thousand cubic yards.

(b) The maximum dry density and optimum moisture content in accordance with ASTM D698 or ASTM D1557 at a frequency of no less than once for every one thousand five hundred cubic yards.

(c) Grain size distribution in accordance with ASTM D6913 and ASTM D7928 at a frequency of no less than once for every one thousand five hundred cubic yards on recompacted soil liner material and at a frequency of no less than once for every three thousand cubic yards on cap soil barrier layer.

(d) Atterberg limits in accordance with ASTM D4318 at a frequency of no less than once for every one thousand five hundred cubic yards on recompacted soil liner material and at a frequency of no less than once for every three thousand cubic yards on cap soil barrier layer.

(e) For recompacted soil liner, the dispersive clay soils classification by pinhole test in accordance with ASTM D4647 at a frequency of no less than once for every fifty thousand cubic yards.

(2) For geosynthetic clay liner, the following:

(a) If the internal drained shear strength is at higher risk of slope failure than the interfaces tested in accordance with paragraph (E) of this rule, the internal drained shear strength in accordance with ASTM D6243 at least twice for the initial use and at least once for each subsequent construction event. Tests involving geosynthetic clay liner material shall be conducted with hydrated samples.

[Comment: If a shear stress point plots below the Mohr-Coulomb shear strength failure envelope defined by the specified factor of safety, it will be considered a failed test.]

(b) The dry bentonite mass (at zero per cent moisture content) per square foot of geosynthetic clay liners in accordance with ASTM D5993 at a frequency of no less than once per fifty thousand square feet.

(3) For the granular drainage material used as drainage medium, permeability in accordance with ASTM D2434 to be tested at least once for every three thousand cubic yards of material.

(4) For any geocomposite drainage layer, to be tested for transmissivity in accordance with ASTM D4716 at the maximum projected load and a frequency of once per five hundred thousand square feet performed in a manner representing field conditions.

(5) For soil material used as cap protection layer and to be classified as a "CL" in accordance with ASTM D2487, the following:

(a) Grain size distribution in accordance with ASTM D6913 and ASTM D7928 at a frequency of no less than once for every three thousand cubic yards.

(b) Atterberg limits in accordance with ASTM D4318 at a frequency of no less than once for every three thousand cubic yards.

(6) For soil material used as added geologic material, the following:

(a) The maximum dry density and optimum moisture content in accordance with ASTM D698 or ASTM D1557 at a frequency of no less than once for every ten thousand cubic yards.

(b) The recompacted laboratory permeability in accordance with ASTM D5084 at a frequency of no less than once for every ten thousand cubic yards.

(c) The dispersive clay soils classification by pinhole test in accordance with ASTM D4647 at a frequency of no less than once for every fifty thousand cubic yards.

(d) Atterberg limits in accordance with ASTM D4318 at a frequency of no less than once for every three thousand cubic yards.

(7) For soil material used as structural fill, the maximum dry density and optimum moisture content in accordance with ASTM D698 or ASTM D1557 at a frequency of no less than once for every ten thousand cubic yards.

(D) For geosynthetics, other synthetic materials, and joint sealing compounds used in the construction of flexible membrane liner, geosynthetic clay liner, and leachate management system, the 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, in accordance with USEPA method 9090 or other documented data. Chemical compatibility testing may be necessary if specified by the director.

(2) Be shown to have properties acceptable for installation and use.

(E) Pre-construction interface testing and reporting. The specific soils and representative samples of the geosynthetic materials that will be used at the site shall be tested for interface shear strength over the entire range of normal stresses that will develop at the facility. Prior to the initial use of each specific geosynthetic material in the construction of engineered components at a facility, the appropriate shear strengths for all soil to geosynthetic and geosynthetic to geosynthetic interfaces that include the material shall be determined at least twice in accordance with ASTM D5321 or ASTM D6243 and at least once for each subsequent construction event using samples of the

materials identified by the initial two tests to be at the highest risk for slope failure. Tests involving the flexible membrane liner interface shall be conducted with a recompacted soil that has the highest moisture content and the lowest density specified for construction of the recompacted soil liner. Tests involving geosynthetic clay liner material shall be conducted with hydrated samples. The results of pre-construction testing specified in this rule shall meet all applicable specifications in this rule and the set of approved parameters in the permit to install application that were established by the slope stability analysis, be evaluated and signed and sealed by a professional engineer registered in the state of Ohio, and be submitted to the appropriate Ohio EPA district office not later than seven days prior to the intended use of the materials.

(F) Quality assurance/quality control. The owner or operator of a scrap tire monofill facility shall demonstrate that the construction of the facility will be in accordance with the applicable authorizing documents including any approved permit to install in a quality assurance/quality control plan that includes the following, as applicable:

(1) The following components:

(a) In-situ foundation preparation.

(b) Added geologic material.

(c) Structural fill.

(d) Liner system.

(e) Leachate management system.

(f) Cap system.

(g) Ground water control structures.

(h) Surface water control structures.

(i) Facility survey mark.

(j) Access roads.

(2) The following testing procedures:

(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 shall be investigated. An area with a verified failure shall be reconstructed to meet specifications and retested at a frequency acceptable to the director. Reconstruction and retesting shall be performed in accordance with paragraph (C) of rule 3745-580-710 of the Administrative Code.

(H) Construction certification report. Pursuant to paragraph (C) of rule 3745-580-710 of the Administrative Code and paragraph (H) of rule 3745-580-725 of the Administrative Code, the owner or operator of a scrap tire monofill facility shall submit a certification report prepared and sealed by a professional engineer registered in Ohio to Ohio EPA and the approved board of health. The owner or operator may submit all certification reports for concurrence after construction of both the liner and leachate collection systems, prior to the acceptance of scrap tires, or upon installation of any of the engineering components specified in the liner and leachate collection systems in each phase of the scrap tire monofill facility construction. The certification report shall include the following:

(1) Results of all testing specified in this rule and the testing specified in the quality assurance/quality control plan.

(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 (C) of rule 3745-580-710 of the Administrative Code specifies that the owner or operator needs to 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 that do not need Ohio EPA concurrence but that 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.

(viii) Access roads.

(b) Plan view of the location of ground water control structures, if applicable.

(c) Plan views of the deployment of the flexible membrane liner panels and the locations of and identification of the destructive tests and all repairs.

(d) Cross sections of the phase at closure taken at the same locations and using the same scale as in the approved permit to install or at an interval no greater than every three hundred feet of length and width that show the following:

(i) The limits of excavation.

(ii) The limits of emplaced waste.

(iii) Final grade including the cap system.

(e) Necessary details.

(4) For a scrap tire monofill facility, after the initial construction and establishment of the facility survey mark, the following information summarizing the activities performed to construct and establish the facility survey mark:

(a) The geodetic survey datasheet of each control point used to establish the horizontal and vertical coordinates of the survey mark.

(b) A table listing the horizontal and vertical coordinates of each control point and survey mark.

(c) A summary of surveying activities performed in determining the coordinates of the facility survey mark.

(d) A plan sheet clearly identifying the location of the survey mark, the control points, and the limits of waste placement on a road map with a scale of one inch equals no greater than one mile.

(e) A detailed drawing illustrating the design of the facility survey mark, as constructed.

(5) Documentation demonstrating that any oil or gas wells that have been identified within the limits of solid waste placement have been properly plugged and abandoned in accordance with Chapter 1509. of the Revised Code prior to any construction in the area of the well.

(6) Qualifications of construction, testing, and construction quality assurance and control personnel including a description of the experience, training, responsibilities in decision making, and other qualifications of the personnel that provided construction oversight and conducted all the testing on the engineered component for which the certification report is submitted.

(7) A signed statement that to the best of the knowledge of the owner or operator of the scrap tire monofill facility, the certification report is true, accurate, and contains all information specified paragraph (E) of this rule.

(I) Submergence facilities. The owner or operator of a scrap tire submergence facility shall comply with the following construction requirements:

(1) All construction requirements specified in this rule except the following:

(a) Paragraph (B)(6) of this rule.

(b) Paragraph (B)(11) of this rule.

(c) Paragraphs (F)(1)(e) and (F)(1)(f) of this rule.

(d) Paragraphs (H)(3)(a)(iv), (H)(3)(a)(v), and (H)(3)(d)(iii) of this rule.

(2) A flexible membrane liner may be placed on top of one of the options for a recompacted soil liner described in paragraph (B)(4)(k) of this rule.

(3) A flexible membrane liner that is placed on the recompacted soil liner or recompacted soil barrier layer and meets the following:

(a) Be sixty mil high density polyethylene (HDPE).

(b) Be an other material or thickness if the flexible membrane liner meets at a minimum the following:

(i) Be negligibly permeable to fluid migration.

(ii) Be physically and chemically resistant to chemical attack by the scrap tires, leachate, or other materials that may come in contact with the flexible membrane liner.

(iii) Have properties for installation and use that are acceptable to Ohio EPA.

(iv) Have a minimum thickness of forty mils.

(c) Be installed as follows:

(i) For installations exceeding ten thousand square feet, with at least one welding technician having seamed a minimum of one million square feet of flexible membrane liner present during installation.

(ii) Be seamed to allow no more than negligible amounts of leakage with seaming material that is physically and chemically resistant to chemical attack by the scrap tires, leachate, or other materials that may come in contact with the seams.

(iii) On a seaming area that is cleaned of deleterious materials immediately prior to seaming.

(iv) Be tested in accordance with the following, unless the manufacturer's specifications for testing

are more stringent:

(a) For the purpose of testing every seaming apparatus in use each day, peel and shear tests performed on scrap pieces of flexible membrane liner at the beginning of the seaming period and every four hours thereafter.

(b) Nondestructive testing performed on one hundred per cent of the flexible membrane liner seams.

(c) Destructive testing for peel and shear performed at least once for every one thousand feet of seam length. An alternative means may be used if it is demonstrated to Ohio EPA that the alternative means meets the requirements of this paragraph.

(d) Electrical leak locations testing in accordance with ASTM D7002, ASTM D7703, ASTM D7240, or ASTM D7953 performed on one hundred per cent of the flexible membrane liner prior to initial backfill over the flexible membrane liner.

(e) Electrical leak locations testing in accordance with ASTM D6707 performed on one hundred per cent of the flexible membrane liner after initial backfilling over the flexible membrane liner.

(v) Be protected with a sixteen ounce liner cushion layer if the potential exists for the flexible membrane liner to come in contact with any sharp edged protrusions or any particles protruding more than one quarter of one inch. The liner cushion layer shall account for the weight of the overlying waste mass and have pre-construction interface testing performed according to paragraph (E) of this rule. If shredded tires are used in the leachate collection layer, a cushion layer consisting of sand, or other material with low puncture risk, a minimum of ten inches thick shall be used.

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