902 KAR 10:081. Construction standards for components of on-site sewage disposal systems.

RELATES TO: KRS 211.350-211.380, 211.990(2)
STATUTORY AUTHORITY: KRS 194.050, 211.090(3), 211.180(3)
NECESSITY, FUNCTION, AND CONFORMITY: KRS 211.350 to 211.380 directs the cabinet to regulate the construction, installation, or alteration of on-site sewage disposal systems except for systems with a surface discharge. The purpose of this administrative regulation is to establish minimum component standards including design, construction, and materials specifications for on-site sewage disposal systems in Kentucky in order to protect the public health.

Section 1. Citation of Administrative Regulation. This administrative regulation may be cited as the "Construction standards for components of on-site sewage disposal systems."

Section 2. Definitions. As used in this administrative regulation the following terms shall have the meanings set forth below:
(1) "Approved" means that which has been considered acceptable to the cabinet.
(2) "Cabinet" means the Cabinet for Human Resources and includes its authorized agents.
(3) "Component" means any device used in the construction, installation or alteration of an on-site sewage disposal system which forms an integral part of that system, and is necessary to its proper operation and maintenance. It includes, but is not limited to:
(a) Sewage pretreatment units, holding tanks, grease traps, pump or dosing tanks, and necessary equipment and appurtenances;
(b) Distribution boxes, alternating valves, filters, and similar devices; and
(c) Piping, fittings, valves, and leaching chambers.
(4) "Effluent" means the liquid discharge of a septic tank or other sewage pretreatment unit.
(5) "Gravelless pipe" means large diameter perforated piping designed for use in lateral field trenches without the use of trench rock or gravel fill material. Such pipe includes a mandatory overwrap or encasing of synthetic filter material meeting specific criteria.
(6) "Grease" means fats or oils of animal, vegetable, or mineral origin, separately or in colloidal or dissolved states in combination with soaps, detergents, and/or food particles.
(7) "Grease trap" means a component designed to separate grease and its constituents from the wastewater stream, provide for storage of separated grease, and discharge the remaining wastewater for treatment.
(8) "Lateral field" means the area in which the subsurface soil absorption system is installed and is a general term for the system itself.
(9) "Low pressure pipe system" means an on-site sewage disposal system consisting of a sewage pretreatment unit, a dosing tank with pump(s) or siphon(s), a pressurized supply line, manifold, and lateral lines, and necessary control devices and appurtenances.
(10) "Leaching chamber" means a specially designed component for use in lateral field trenches or beds, with or without the use of trench rock or gravel fill material, which forms an open bottomed chamber or cavern over the subsurface soil absorption surface, and which interlocks with other such chambers to obtain the necessary absorption surface area.
(11) "On-site sewage disposal system" means a complete system installed on a parcel of land, under the control or ownership of any person, which accepts sewage for treatment and ultimate disposal under the surface of the ground. The common terms "on-site sewage system" or "on-site system" also have the same meaning. This definition includes, but is not limited to, the following:
(a) A conventional system consisting of a sewage pretreatment unit(s), distribution box(es), and lateral piping within rock-filled trenches or beds;

(b) A modified system consisting of a conventional system enhanced by shallower trench or bed placement, artificial drainage systems, dosing, alternating lateral fields, fill soil over the lateral field, or other necessary modifications to the site, system or wasteload to overcome site limitations;

(c) An alternative system consisting of a sewage pretreatment unit(s), necessary site modifications, wasteload modifications, and a subsurface soil absorption system using other methods and technologies than a conventional or modified system to overcome site limitations;

(d) Cluster systems which accept effluent from more than one (1) structure's or facility's sewage pretreatment unit(s) and transport the collected effluent through a sewer system to one (1) or more common subsurface soil absorption system(s) of conventional, modified or alternative design; and

(e) A holding tank which provides limited pretreatment and storage for off-site disposal where site limitations preclude immediate installation of a subsurface soil absorption system, or connection to a municipal sewer.

(12) "Person" means any individual, firm, association, organization, partnership, business trust, corporation, company or governmental unit.

(13) "Secretary" means the Secretary for the Cabinet for Human Resources.

(14) "Sewage pretreatment unit" means a watertight sewage treatment structure designed and constructed to receive raw sewage, separate solids from liquids, digest organic matter through a period of retention, and allow clarified effluent to discharge to a subsurface soil absorption system. Such pretreatment units fall into three (3) basic categories:

(a) Septic tanks - which rely predominantly on anaerobic bacterial action for treatment;

(b) Aerobic units - which introduce atmospheric air into the sewage to promote treatment by aerobic bacteria; and

(c) Combination units - which provide treatment through both anaerobic and aerobic bacterial action and/or mechanical filtering, ozonation or ultraviolet irradiation.

(15) "Subsurface soil absorption system" means that portion of an on-site sewage disposal system which accepts effluent from a sewage pretreatment unit(s) for further treatment by microbial, plant and animal life within the soil, as well as treatment by filtration, chemical decomposition and bonding within the soil itself, and consists of:

(a) Devices, components, and piping to transport effluent under pressure or by gravity flow, and distribute the effluent to the soil absorption surfaces;

(b) Trenches, beds, chambers, mounds, lagoons, artificial marshes, etc., separately or in combination, which form or enclose the soil absorption surfaces;

(c) Rock, gravel, or other fill materials required within the system, including barrier materials, and fill soil within or over the system; and

(d) Artificial drainage systems, and other necessary site or soil modifications.

Section 3. Approval Procedures. (1) All commercial manufacturers and suppliers of materials, components, and equipment designed or intended for use in the construction of on-site sewage disposal systems shall obtain approval of such materials, components, and equipment from the cabinet prior to their sale or use in Kentucky. Such approval shall be based upon conformance to recognized design, materials, construction, and performance standards of the National Sanitation Foundation (NSF), the American Society for Testing and Materials (ASTM), and the standards set forth in this administrative regulation.

(2) Manufacturers, purveyors and suppliers of materials, components, and equipment shall submit the following information, as applicable, to the cabinet in review and consideration in the approval process:

(a) All applicable plans, specifications, process descriptions, and other relevant data.

(b) Supportive test data from independent laboratories, testing firms, NSF, ASTM, and other approved organizations.

(c) Other pertinent information as requested by the cabinet.

(3) New or experimental materials, components, or equipment shall be submitted for approval as outlined in subsection (2) of this section and the following additional requirements and restrictions shall apply:

(a) Those materials, components, or equipment which consist of modifications to existing approved products shall be considered for approval after demonstration, through independent testing of the modifications, that improved performance, service life, or ease of maintenance and operation results.

(b) Those materials, components, or equipment which involve new or experimental technologies relating to design, construction, or operational process shall be considered for approval on a probationary basis. During the probationary period, it shall be the responsibility of the person seeking approval of such product to contract with an independent testing firm to provide monitoring of the performance of the product in its intended usage. Such monitoring of the product shall include documentation of the site conditions where the product is installed, the waste load generated by the user and its constitution, and other parameters deemed necessary by the cabinet. In the event that the product fails to perform in an acceptable manner, it shall be the responsibility of the person seeking its approval to replace the product with another product which is approved by the cabinet for that particular use.

(c) Any materials, components, or equipment which, in the opinion of the cabinet, meet the requirements for approval after careful study and testing, as required, shall be considered to be approved for use in Kentucky for the specific purpose(s) intended. Such approval shall be made in writing to the person requesting same and shall set forth any conditions or restrictions for the use of the product when deemed necessary by the cabinet. Each product, so approved, shall be listed by the cabinet on an "approved listing of materials, components, and equipment," which shall be updated on a timely basis and distributed to local health departments and other interested parties on request.

Section 4. Septic Tank Pretreatment Units. (1) Precast concrete.

(a) All precast concrete septic tanks shall be designed and constructed so as to provide sufficient rigidity and structural strength to prevent damage due to hydrostatic water pressure and support vertical uniform loading of 150 lb./sq. ft. on the top of the tank.

(b) A minimum and product strength of 4,000 pound per square inch shall be used in the construction of the tank.

(c) The top, bottom, ends and sides of the tank shall have a minimum thickness of two and one-half (2 1/2) inches.

(d) The tank shall be reinforced by using a minimum reinforcing of six (6) inch No. 10 gauge welded steel reinforcing wire lapped at least six (6) inches. Other reinforcing methods may be used provided that such other methods can be demonstrated to the satisfaction of the cabinet to be equal, or superior, to the method described herein.

(e) The tank shall be so designed and constructed that all joints, seams, or other openings shall be watertight in use. Asphalt compounds, neoprene gaskets, or other acceptable sealant materials shall be used to insure watertightness.

(f) At least two (2) manholes shall be provided to permit access for maintenance of the tank. Manholes shall have a minimum dimension of ten (10) inches and a maximum of twenty-four (24) inches measured on the bottom edge of the manhole opening into the tank. Manholes shall be located on each end of the tank over the inlet and outlet structures (baffles or tees). The manhole openings shall be beveled so as to adequately seal and support the manhole cover. The manhole cover shall possess sufficient strength to support a uniform load of 150 lb./sq. ft. without damage to the cover or tank and provide a means for removal (handles).

(g) Cast-in-place baffles, at inlet and outlet ends of the tank have a minimum thickness of two (2)

inches and be reinforced in the same manner as the tank. For cast-in-place baffles reinforcing wire into and along the tank side walls a minimum of (6) inches for proper anchorage. For tanks using drop-in baffles, a molded in slot or groove with a minimum one (1) inch penetration into the tank side wall shall be provided to retain the baffle. Such slot or groove shall be slightly tapered to produce a secured "wedge fit" baffle. For bolt-on tee-type baffle structures, stainless steel bolts, washers and nuts shall be used for anchorage. Such bolts shall be cast-in-place in the baffle or tank endwall and securely anchored by attachment to tank or baffle reinforcing material. On those tanks where baffle attachment bolts penetrate through the tank endwall suitable bushings or seals shall be used to render bolt holes watertight. Suitable sealants shall also be used on all baffle edges which contact the tank endwall to prevent short-circuiting of tank contents.

(h) In lieu of concrete baffles, sanitary tees or other baffle devices of corrosion resistant materials (fiberglass, plastic) may be used as long as joints are properly sealed, acceptable attachment methods are used, and the specified dimensions above and below the liquid level of the tank are maintained.

(i) Internal dimensions of the tank shall fall within plus or minus one (1) foot of the proportional ratios of 2:1 to 3:1, the length being approximately two (2) to three (3) times the width. The minimum liquid depth shall be thirty-four (34) inches with maximum depth of fifty-four (54) inches. The inlet and outlet pipe knockouts or holes shall be of sufficient diameter to accept a minimum four (4) inch diameter pipe and shall be so designed as to provide a minimum height difference of three (3) inches for the inlet pipe invert above the outlet pipe invert. Inlet and outlet holes shall be so located on the ends of the tank as to provide a minimum freeboard space of ten (10) inches to one (1) foot between the liquid level and the inside top surface of the tank for scum storage. Both inlet and outlet baffles or tees shall extend above the liquid level of the tank to within at least two (2) inches but not less than one (1) inch of the inside top surface of the tank to contain scum and provide venting space for gases. Baffle designs which extend to the inside top of the tank may be used provided that a slotted vent space of a minimum height of one (1) inch by four (4) inches in width is located at the juncture of the baffle and tank top in the center of the baffle. The inlet tee or baffle shall extend below the liquid level between eight (8) to ten (10) inches, and the outlet baffle or tee shall extend downward to thirty-five (35) to forty (40) percent of the total liquid depth of the tank. When baffles are used, the distance between the outlet baffle and tank endwall shall be between four (4) to six (6) inches, and the distance between the inlet baffle and endwall shall be between six (6) to ten (10) inches.

(j) All tanks offered for sale or use in Kentucky shall bear, by imprint, stencil, or other acceptable means of marking, the manufacturer's name, the serial number assigned to the manufacturer's plans and specifications approved by the cabinet, and the liquid or working capacity of the tank. This imprint, stencil, or other marking shall be located to the right of the knockout or hole made for the outlet pipe on the outlet end of the tank.

(2) Constructed on site. Septic tanks constructed on site of cast-in-place concrete, or concrete block shall be constructed to conform with the requirements in subsection (1) of this section except as follows:

(a) Cast-in-place concrete septic tanks shall have a minimum wall thickness of four (4) inches.

(b) Concrete block septic tanks shall have a minimum wall thickness of at least eight (8) inches when the design volume is less than 1,000 gallons and a minimum wall thickness of at least ten (10) inches when the design volume is 1,000 gallons or more. All septic tanks constructed of block shall be plastered on the inside with a 1:3 mix (one (1) part cement, three (3) parts sand) of portland cement at least three-eighths (3/8) inch thick or the equivalent using other approved waterproofing material, and provided with acceptable reinforcing within all walls.

(c) The bottom and top of the constructed on site septic tank shall be poured reinforced concrete with a minimum thickness of four (4) inches.

(d) For large capacity (5,000 gallons or more) cast-in-place concrete tanks, maximum liquid depth shall be sixty-six (66) inches.

(3) Prefabricated steel. Prefabricated steel septic tanks shall conform to the requirements listed under subsection (1)(a), (e), (f), (h), (i) and (j) of this section, in addition to the following:

(a) All prefabricated steel tanks shall be thoroughly coated on all surfaces with a minimum one-eighth (1/8) inch thick coating of liquid asphalt, mastic compound, plastic waterproofing compound, or liquid cured vinyl. Each such septic tank shall be accompanied on site delivery by a one-half (1/2) pint container of the coating material for use in touchup coating of steel surfaces of the tank exposed through damage in shipping and handling. If such volume is insufficient to repair all damaged areas, additional coating material shall be secured by the installer.

(b) Coated steel baffles shall not be used in prefabricated steel tanks. Sanitary tees of approved plastic, fiberglass, or cast iron shall be required.

(4) Molded plastic, fiberglass. Septic tanks of molded plastic, fiberglass, or other such type of materials shall conform to the requirements listed under subsection (1)(a), (e), (f), (h), (i) and (j) of this section, in addition to the following: baffles, if used in lieu of sanitary tees, shall be molded or formed in place so as to be an integral part of the tank. Glued, riveted, or otherwise mechanically attached baffles are not permitted (solvent welding on plastic tanks and resin bonding on fiberglass are acceptable). Such baffles shall be formed of material equal in thickness and rigidity to the tank wall material.

Section 5. Aerobic Pretreatment Units. (1) Precast concrete tank. All precast concrete tank aerobic pretreatment units shall comply with the construction requirements of Section 4(1)(a), (b), (c), (d), (e), (f) and (j) of this administrative regulation, in addition to the following:

(a) All cast-in-place baffles, compartment walls, dividers, weirs, and other devices or structural forms shall be a minimum thickness of two (2) inches and be reinforced in the same manner as the tank. Such reinforcing material shall extend into and along the tank side wall a minimum of six (6) inches.

(b) Baffles, compartment walls, dividers, weirs, and other such devices or structural forms that are not cast-in-place or may be of dissimilar materials to the tank shall be of corrosion resistant materials, of sufficient structural strength and anchorage to the tank to prevent damage or dislodgment in normal operation, and where requiring routine maintenance, readily accessible through tank access manholes.

(c) All manholes providing access to mechanical or electrical components, chlorinating or other treatment devices or filters shall be provided with risers extending to grade to allow ready access for maintenance. Covers for such manholes or risers shall be provided with locks or other devices to prevent entry by unauthorized persons. On units which are intended to be installed flush with grade or above grade, which are designed to have an open top, suitable gridding, decking, or other such barriers to entry to the tank shall meet the 150 lb./sq. ft. support strength requirements and shall be so designed and installed to prevent entry to the tank or contact with its contents by unauthorized persons.

(2) Prefabricated steel. All prefabricated steel tank aerobic pretreatment units shall comply with the construction requirements listed in Section 4(1)(a), (e), (f), (j), and (3)(a) of this administrative regulation, subsection (1)(b) and (c) of this section, in addition to the following: coated steel, welded-in-place or mechanically attached baffles, compartment walls, dividers, weirs, and other devices or structural forms shall receive additional corrosion protection materials or coatings when they are exposed directly through splash or immersion on two (2) or more surfaces or sides to tank liquid contents.

(3) Molded plastic, fiberglass. All molded plastic or fiberglass tank aerobic pretreatment units shall comply with the construction requirements listed in Section 4(1)(a), (e), (f) and (j) of this administra-

tive regulation, and subsection (1)(b) and (c) of this section, in addition to the following: baffles, compartment walls, dividers, weirs, and other such devices or structural forms, if cast or molded in place, shall be formed of material equal in thickness and rigidity to the tank material.

(4) Piping, mechanical devices and electrical equipment, filtration devices, and other appurtenances.

(a) All internal or external piping or conduits and fittings necessary to the transport of tank sewage contents between tank compartments, mechanical equipment, or other components of the treatment process involved shall be of Schedule 40 PVC or ABS plastic pipe. Mixing of PVC and ABS or other dissimilar plastic pipe or fittings is prohibited.

(b) Mechanical fittings and connections where used to connect PVC or ABS piping to equipment or components shall be corrosion resistant and of a type, design, and construction compatible for use with the type of pipe involved.

(c) Mechanical aerators, stirrers, diffusers, rotating disks, and other devices used to provide direct exposure of atmospheric air to tank sewage contents shall be constructed of corrosion resistant materials and of sufficient structural strength to withstand normal operating stresses without damage or deformation resulting in system malfunction for the designed service life of the device.

(d) Pumps, electrical motors, or other such devices shall be of sealed or submersible design and construction when subject to submersion, splash, or corrosive atmosphere within the aerobic pretreatment unit. Such pumps, motors, or other such devices shall be properly sized and designed for the intended use and duty cycle.

(e) Filters, chemical feeders, and other such devices shall be constructed of corrosion resistant materials and possess sufficient strength to withstand normal operational stresses without damage or deformation resulting in system malfunction.

(f) Electrical controls, switches, ozone generators, ultraviolet generators, and other such devices relying upon electrical current for operation shall be designed and constructed as to be water and corrosive vapor proof in all portions of the device where electrical current carrying components are located. All such devices shall be properly grounded and otherwise designed, constructed, installed, and operated in accordance with National Electrical Code requirements.

(g) All fasteners, brackets, clips, hangers, or other such devices used in the anchorage, installation, mounting, or attachment of unit components and equipment both internal or external to the aerobic pretreatment tank shall be designed and constructed of materials possessing sufficient strength and corrosion resistance to withstand normal operational stresses without damage or deformation resulting in system malfunction.

(h) All components of aerobic pretreatment units which require routine maintenance shall be installed and located within the unit as to be readily accessible. Such components which require replacement, removal, or dismantling for routine maintenance shall be designed, constructed, and installed so as to facilitate their replacement, removal, or dismantling with simple tools. A maintenance instruction manual using pictures and simple language for identification of unit components, maintenance to be performed, components needing routine replacement, removal or dismantling procedures, maintenance interval, and simple troubleshooting procedures shall be included with all units. Such manual shall be provided to the ultimate operator or user of the unit. When aerobic pretreatment units are to be installed by other persons, rather than the manufacturer or his agents, a detailed installation manual shall be supplied outlining proper installation procedures including hookup to an electrical power source, unit start-up procedures, and necessary adjustments or calibrations to be made to meet manufacturer's operating specifications for effluent quality.

Section 6. Dosing and Holding Tanks. (1) All dosing and holding tanks shall comply with the general construction requirements listed in Section 4 of this administrative regulation for septic tanks, based upon the type of material used in their construction, in addition to the following:

(a) Access manholes for dosing or holding tanks shall be extended to grade through the use of suitable risers to permit ease of access for maintenance and pumping.

(b) Such manholes in dosing and holding tanks shall provide a minimum opening of eighteen (18) inches by eighteen (18) inches into the tank. Manhole riser lids or covers shall be designed and constructed so as to be watertight and, through the use of locks, locking devices, or other means, prevent access to the tank by unauthorized persons.

(c) All dosing or holding tanks, due to their frequently empty or partially filled condition, shall be designed or installed (using suitable anchoring devices or antiflotation devices) to prevent flotation or vertical shifting due to ground water pressure.

(2) All dosing and holding tank equipment, controls, and appurtenances shall comply, where applicable, with the requirements of Section 5(4)(a), (b), (d), (f), (g) and (h) of this administrative regulation, in addition to the following:

(a) High water alarms, including an audible or visible alarm system within the structure served by the dosing or holding tank, shall be installed in such tanks and calibrated to activate an alarm whenever the tank liquid level reaches eighty-five (85) percent of capacity. Such alarms shall be connected to a separate electrical circuit, and visible systems shall be located in an area of high pedestrian traffic.

(b) When pumps are used for dosing effluent into the lateral field or are used for lifting effluent to a lateral field above the elevation of the dosing tank, electrically operated mercury float switch controls shall be provided to permit automatic operation of such pumps. Manually operated pump controls are not permitted. When pumps are used, they shall be installed in an elevated position in respect to the tank bottom, by placement on stands designed for such purpose, concrete blocks, or through the use of suitable hangers to allow for sludge storage space and prolong service life of the pumps. Elevation distance from the tank bottom shall be a minimum of eight (8) inches.

(c) In lieu of pumps, automatic dosing siphons may be used for lateral field dosing where a suitable downhill gradient exists from the elevation of the siphon to the lateral field.

Section 7. Grease Traps. (1) All grease traps shall comply with the general construction requirements listed in Section 4 of this administrative regulation for septic tanks, based upon the type of material used in their construction, in addition to the following:

(a) Inlet baffle, sanitary tee or baffle device shall extend two (2) to no more than four (4) inches below the liquid level of the trap;

(b) Outlet baffle, sanitary tee or baffle device shall extend downward to eighty (80) percent of the total liquid depth of the trap;

(c) The minimum liquid depth shall be twenty-four (24) inches with a maximum depth of forty-eight (48) inches;

(d) Grease traps are exempted from the 2:1 to 3:1 length to width ratio requirements in Section 4 of this administrative regulation; and

(e) A manhole or manholes shall be provided on each grease trap to allow free access for servicing all areas of the trap. Such manhole(s) shall have a minimum dimension of eighteen (18) inches measured at the bottom edge of the manhole opening into the trap, and manhole risers shall be used to extend the manhole(s) to grade.

Section 8. Distribution Devices. (1) Precast concrete.

(a) All precast concrete distribution boxes shall be designed and constructed to provide sufficient strength and structural integrity to withstand a vertical uniform load of 150 lb./sq. ft. on the top of the box.

(b) A minimum end product strength of 4,000 pounds per square inch shall be used in the construction of the box and lid.

(c) A minimum wall thickness of one and one-half (1 1/2) inches shall be used in the construction of distribution box bottoms, side walls, and lids and shall be reinforced by a minimum No. 10 gauge six (6) inch by six (6) inch welded steel reinforcing wire, or equivalents, as approved by the cabinet.

(d) Distribution box lids or covers shall meet the requirements of paragraph (a) of this subsection and shall be provided with suitable handles for removal.

(e) Knockouts or holes for inlet and outlet piping shall be of sufficient diameter to accept four (4) inch diameter piping but no more than five (5) inches in diameter at the inside surface of the box.

(f) All distribution devices offered for sale or use in Kentucky shall bear, by imprint, stencil, or other acceptable means of marking, the manufacturer's name and the serial number assigned to the manufacturer's plans and specifications approved by the cabinet. This imprint, stencil, or other marking shall be located on the inlet end of the device. Low pressure pipe manifolds shall meet the identification requirements for plastic piping in Section 9 of this administrative regulation.

(2) Molded plastic and fiberglass. Molded plastic or fiberglass distribution boxes shall be designed and constructed to meet the requirements listed in subsection (1)(a), (d), (e) and (f) of this section.

(3) Equal flow and level type design standards.

(a) Outlet holes or knockouts in equal flow and level boxes shall be spaced a minimum of seven (7) inches on centers to permit access for application of waterproofing sealants around lateral piping and the external surface of the box side wall or endwall. When plastic or neoprene connectors are cast into the box, this requirement may be waived. Outlet holes or knockouts shall be located a minimum distance of six (6) inches on centers, on a single plane, above the inside bottom surface of the box and a minimum of three (3) inches on centers from adjacent side walls in the outlet portion of the box. At the inlet portion of equal flow boxes a minimum distance of eight (8) inches on centers shall be maintained between outlet holes and the side wall or endwall to allow for the placement of a baffle to retard incoming effluent velocity.

(b) Centerline of the inlet hole or knockout shall be a minimum distance of one and one-half (1 1/2) inches to a maximum of three (3) inches above the centerline of the outlets.

(c) All equal flow boxes shall be provided with a baffle on the inlet end of the box. A double flange, molded or cast-in slot, or other acceptable means to retain the baffle in place shall be provided. Baffle material and construction shall be equal to that used in the box itself. Baffles and their mounts or retainers shall be so designed as to provide a passageway for effluent between the box bottom and bottom edge of the baffle of no more than two (2) inches in height. The baffle shall extend to one (1) inch above the top of the inlet.

(d) Equal flow boxes shall be designed so as to provide unobstructed access, on removal of the lid or top, for direct, simultaneous viewing of all outlets to facilitate the performance of "water leveling" procedures during installation.

(4) Hillside or drop box type design standards.

(a) Lateral outlet holes or knockouts shall be located a minimum of two and one-half (2 1/2) inches on centers, on a single plane above the inside bottom surface of the box, and a minimum of three (3) inches on centers from adjacent side walls.

(b) Centerline of the inlet hole or knockout shall be a minimum of five (5) inches above the centerline of the lateral outlets and a minimum of one (1) inch above the centerline of the supply line outlet going to the next box in series.

(c) Hillside or drop boxes shall be designed so as to provide sufficient separation distance (twelve (12) inches or greater recommended) between the inlet side wall and supply line outlet side wall to minimize the risk of short-circuiting of effluent under heavy flow conditions or on steep hillsides where gradient induced flow velocity is created. In lieu of this requirement, box designs offsetting the vertical centerlines of inlets and supply line outlets or other acceptable means, may be employed.

(5) Plastic low pressure pipe manifolds. All plastic pipe, fittings, and connectors used in low pressure pipe supply lines and manifolds shall be of Schedule 40 PVC or ABS construction and materi-

als.

(6) Alternating valves and devices design standards.

(a) Alternating valves and devices shall meet the general design and construction standards listed in subsection (1)(a) and (d) of this section, and if constructed of precast concrete, subsection (1)(b) and (c) of this section as well.

(b) All alternating valves and devices shall be designed and constructed to provide a positive seal to each outlet when in a closed position. The valving device shall be constructed of corrosion resistant materials and of sufficient strength to withstand normal operational stresses without damage or deformation resulting in valve malfunction.

(c) All alternating valves and devices shall be fitted with risers and watertight lids or covers, extending to grade, which will permit unobstructed access for maintenance, inspection, and operation.

Section 9. Piping, Fittings, and Connectors. (1) Nonperforated pipe - gravity flow usage.

(a) All nonperforated piping used for gravity flow carriage of effluent between septic tanks in series, septic tanks or other pretreatment units and distribution or alternating devices, and for two (2) feet into lateral trenches or beds from distribution devices shall be at least SDR 35 ASTM-D3034 and D3033 for PVC and ASTM-D2751 for ABS. 1,500 lb. crush ASTM-F810 for polyethylene may be used between distribution devices and lateral trenches or beds.

(b) All such nonperforated piping shall be of a minimum internal diameter of four (4) inches, except that such piping used between distribution devices and lateral trenches or beds may be reduced to a minimum internal diameter of two (2) inches with the use of approved reducer coupler fittings.

(c) Each standard section of pipe as supplied by the manufacturer shall be plainly marked, embossed, or engraved showing the manufacturer's name or hallmark, the SDR 35 ASTM D3034, D3033, or D2751, 1,500 lb. crush ASTM-F810 designation, and the type of pipe material (PVC, ABS, or polyethylene).

(2) Nonperforated pipe - pressure usage.

(a) All nonperforated piping used for pressurized carriage of effluent between dosing or pumping and distribution or alternating devices shall be of at least 160 psi PVC or ABS.

(b) 160 psi polyethylene pipe or equivalent may be used in all applications listed above in lieu of PVC or ABS piping, except in the construction of any portion of a low pressure pipe (LPP) system where PVC or ABS pipe shall be required.

(c) Each standard section of pipe as supplied by the manufacturer, or in the case of polyethylene or equivalent piping rolls at not greater than ten (10) foot intervals, shall be plainly marked, embossed, or engraved showing the manufacturer's name or hallmark, the 160 psi designation, and the type of pipe material.

(d) All such pipe used on an individual low pressure pipe (LPP) system installation shall be of the same type of material - mixing of PVC, ABS, polyethylene, or other equivalent piping is prohibited.

(3) Perforated pipe - gravity flow usage.

(a) All perforated pipe used for gravity flow carriage and distribution of effluent within lateral trenches, beds, mounds, or other such applications shall meet 1,500 lb. crush ASTM-F810 standards for rigid piping and ASTM-F405 for corrugated semirigid piping.

(b) Each standard section of pipe as supplied by the manufacturer shall be plainly marked, embossed, or engraved showing the manufacturer's name or hallmark, the type of pipe material, and showing the product meets applicable ASTM standards and a bearing load of 1,500 lbs., per foot. In addition, a painted or other clearly marked line or spot shall be marked on each section to denote the top of the pipe.

(c) All such gravity flow usage perforated pipe shall have a minimum internal diameter of two (2) inches.

(d) On two (2) inch or three (3) inch diameter pipe: if one (1) row of holes is use, it shall be located directly opposite the top marking on the pipe and holes shall be a minimum one-fourth (1/4) inch in diameter; if two (2) rows of holes are used, they shall be one-quarter (1/4) inch to five-sixteenths (5/16) inch in diameter, and evenly spaced and placed within an arc of 120 degrees on the bottom of the pipe. Spacing of holes longitudinally shall be between twelve (12) inches to five (5) feet on centers.

(e) All four (4) inch diameter or greater pipe shall have at least two (2) rows of holes five-sixteenths (5/16) to one-half (1/2) inch in diameter, evenly spaced and placed within an arc of 120 degrees on the bottom of the pipe. If three (3) holes are used, the center row shall be directly opposite the top marking. Spacing of holes longitudinally shall be between three (3) to twelve (12) inches on centers.

(4) Perforated pipe - gravelless pipe design.

(a) All eight (8) and ten (10) inch I.D. corrugated polyethylene pipe used in gravelless pipe lateral fields shall meet the requirements of ASTM F667.

(b) Each standard section of pipe as supplied by the manufacturer shall be plainly marked, embossed, or engraved showing the manufacturer's name or hallmark, the type of pipe material, and showing the product meets ASTM F667. In addition, a painted or other clearly marked line shall be placed on each section to denote the top of the pipe.

(c) All gravelless piping shall be encased, at the point of manufacturer, with a spun bonded nylon filter wrap, or equivalent, meeting or exceeding the performance criteria below:

Physical Properties	Nominal Values	Minimum Values
Weight, oz./sq.yd. (ASTM D3776-79)	0.85	0.75
Thickness, Mils (ASTM D1777-64/1975)	5.4	4.4
Fiber size, denier per filament (dpf)	4.7	4.1
Grab Strength, lbs. (ASTM D1682-64/1975) Machine direction Transverse direction	 26 18	 19 11
Burst strength, psi (ASTM D231-62/1975)	36	26
Air permeability,cfm/sq.ft. (ASTM D737-75/1980)	700	500
Water flow rate	500 gpm/sq.ft. @ 3" Head	
Specific gravity	1.0 - 1.3	
Temperature resistance (ASTM D648)	425°F	
Surface reaction to water	Hydrophilic	
Fiber length	Continuous	

(d) Gravelless pipe hole placement and diameter shall be as follows: holes shall be cleanly drilled

and be placed in two (2) rows spaced 120 degrees apart along the bottom half of the pipe and 120 degrees from the top stripe to either row. Hole size shall be between five-sixteenths (5/16) inch to one-half (1/2) inch in diameter, and holes shall be placed only in corrugation "valleys," not on the crown or in the corrugation sidewall.

(e) All gravelless piping and encasing filter wrap shall be further encased, at the point of manufacture, within a plastic shipping and storage bag of sufficient burst strength, tear resistance and opacity, to prevent physical damage and ultraviolet radiation deterioration of the filter wrap.

(f) The manufacturer shall also make available suitable wide-width plastic tape for sealing of pipe section and fitting joints.

(5) Perforated pipe - pressure usage, low pressure pipe systems (LPP).

(a) Pipe used for pressure carriage and distribution of effluent within lateral trenches, beds, mounds, or other low pressure pipe (LPP) applications shall be of at least 160 psi PVC or ABS construction. Deep hub water line type pipe shall be used.

(b) Pipe shall meet the requirements listed under subsection (2)(c) and (d) of this section.

(c) Minimum pipe internal diameter shall be determined on a case-by-case basis, based upon system size, configuration, and other factors necessary in the design of a low pressure pipe system. In no case shall the internal diameter be less than one (1) inch.

(d) Pipe perforations shall run in a straight line along the bottom of the pipe. Where preperforated pipe is unavailable, perforations shall be hand-drilled, and deburred. Hole diameters and hole spacing shall be determined on a case-by-case basis relative to design requirements of the low pressure pipe system. Hole sizes may range from 5/32 to one-fourth (1/4) inch in diameter, and hole spacing form three (3) to eight (8) feet depending on design requirements.

(7) Fittings and connectors.

(a) Piping elbows, tees, wyes, reducers, end caps, plugs, connectors, and other such fittings shall be designed and constructed for the intended use.

(b) Fittings and connectors shall be formed of materials compatible with the piping to which they are joined and meet the same standards as that piping. Mixing of different pipe and fitting materials except when expressly designed and constructed for such purpose is prohibited.

(c) Joints formed between fittings, connectors, and/or piping shall be rigid and watertight and shall be made by the methods (solvent welding, chemical fusion, mechanical compression, etc.) applicable to the materials joined.

Section 10. Leaching Chambers. (1) All leaching chambers shall comply with the general construction requirements listed in Section 4 of this administrative regulation for septic tanks, based upon the type of material used in their construction, in addition to the following:

(a) Metal leaching chambers are prohibited;

(b) All leaching chambers shall be designed and constructed to support vertical uniform loading of 600 lb./sq.ft. on the top of the chamber without damage or permanent deformation;

(c) All leaching chambers shall be designed and constructed to provide ports, slots, holes or other similar openings on sidewalls to allow air movement and effluent access to lateral field trench or bed sidewall absorption surfaces;

(d) All leaching chambers shall be designed and constructed to be interlocking to allow serial installation of chambers, and be provided with acceptable end plates, caps or other necessary fittings and connectors;

(e) All leaching chambers shall be provided with at least one (1) inspection port of a minimum internal dimension of six (6) inches centrally located in the top of the chamber; and

(f) All such chambers offered for sale or use in Kentucky shall bear, by imprint, stencil, or other acceptable means of marking, the manufacturer's name and the serial number assigned to the manufacturer's plans and specifications approved by the cabinet. This imprint, stencil, or other mark-

ing shall be located beside the observation port.

Section 11. Trench Fill and Barrier Material. (1) Trench fill material.

(a) River gravel or crushed dolomitic limestone shall be used for bedding and trench fill material for conventional gravity flow lateral lines. Foreign matter, dust, and fines shall be removed. Such material shall be of sufficient hardness to attain a three (3) on the Moh's Scale (material hard enough to scratch a copper penny without crumbling or powdering shall be considered acceptable). Such material shall conform to the sizing standards and specifications of the Kentucky Transportation Cabinet for No. 2, No. 23, and No. 4 coarse aggregates, except that other grades may be used if they are in conformance with the general requirements of this paragraph and are acceptable to the cabinet. A size range of three-quarters (3/4) inch to two and one-half (2 1/2) inches in rough diameter shall be used, and material shall be graded for uniformity in size.

(b) Other materials such as blast furnace slag may be considered for usage if such materials can meet or exceed all of the requirements of paragraph (a) of this subsection.

(c) Pea gravel of a minimum one-fourth (1/4) inch diameter shall be used for bedding and trench fill material for low pressure pipe systems. River gravel or crushed limestone may also be used if washed and screened to a uniform size range of three-fourths (3/4) inch to one and one-half (1 1/2) inch.

(d) Graded sands used for the construction of mound systems or filter units shall be sized according to the design requirements of the system or unit involved.

(e) Crushed rock, gravel, pea gravel, sand, or other such materials meeting the requirements of this section for use as trench fill, lateral bedding material, mound fill, or filter material may be used, as applicable, in the construction of curtain, vertical, and underdrain ground water drainage systems.

(2) Trench barrier material.

(a) Straw or synthetic filter fabrics shall be used in all lateral trenches, beds, mounds, subsurface sand filters, or ground water drainage systems to provide a barrier to the entrance of soil backfill into the rock, gravel, pea gravel, or sand fill in such trenches, beds, mounds, filters, or drainage systems.

(b) Other similar materials may be considered for such usage provided that they can be demonstrated to perform in an equivalent manner with the above and do not restrict air movement within the trench, bed, mound, filter, or drainage system. (12 Ky.R. 1457; eff. 3-4-1986; 15 Ky.R. 619; eff. 9-21-1988; Crt eff. 4-5-2019.)