

Commercial Contractor Exam Study Guide



A passing score of 70% will be required for Commercial Contractor Certification

A passing score of 80% will be required for Level I Inspector Certification

In preparation for the exam, it is recommended that individuals refer to the study guides on the Department's website at www.dph.ga.gov and review the Rules of the Department of Public Health, 511-3-1, as well as the Georgia Manual for Onsite Sewage Management Systems.

Installation contractors must earn a passing score on the Residential Contractors Exam before sitting for the Commercial Contractors Exam.

Please contact the State Office at 404.657.6534 to make an appointment to sit for the exam.

This study guide is not intended to be a comprehensive resource for commercial on-site sewage system installations. Please refer to the Manual for On-site Sewage Management Systems for more detailed information.

Introduction

The purpose of this study guide is to assist you in preparing for the commercial contractor's certification exam. The Georgia Department of Public Health's "Rules and Regulations for On-Site Sewage Management Systems", Chapter 511-3-1-.16, requires the certification of individuals performing services as a septic tank contractor, inspection personnel, maintenance personnel, or sewage pumper. Since February 20, 2000, all sewage system contractors must have a valid "Georgia On-Site Sewage System Contractors Certification". Contractors who do not have a certification or who violate any of the provisions of the Department's rules will be guilty of a misdemeanor and subject to appropriate punishment under Georgia Law.

Contractor certification has been divided into several categories beginning with the residential contractor's certification, which all on-site sewage management system installers must hold. Additional modules, such as this one, have been added to address contractors involved in more complex or specialized sewage system installations. The "Commercial Contractors Certification" will focus on larger commercial or industrial installations that may require additional features such as pretreatment of high strength effluent, dosing devices, or components such as tanks which have to be built or fabricated at the construction site. The "Commercial Contractors Certification" is required to install any on-site sewage management system with a design flow greater than 2,000 gallons per day.

Septic Tanks – General

Some commercial installations may be able to use currently approved pre-cast or pre-manufactured septic tanks. Such tanks may be made of concrete, plastic, fiberglass or such other materials. Larger tanks may have to be constructed on-site.

Septic Tank Sizing – The treatment capacity for all septic tanks shall be sized for the daily (24 hours) peak flow volume of the facility being served. Septic tanks may be trained together, however, the volume of the first compartment of the first treatment tank shall be at least two-thirds the volume of the total 24-hour flow. The minimum septic tank size shall be 1000 gallons. In facilities where garbage grinders are to be used, total tank capacity shall be increased by fifty percent (50%).

"T"s and Filters – All tanks shall be equipped with four-inch (4") PVC, ASTM 3034 rated or equivalent tees at the inlet and outlet ends of the tank. Tees shall be constructed so they extend into the liquid a minimum of twenty-five percent (25%) and a maximum of fifty percent (50%) of the liquid depth of the tank. The invert of the outlet tee shall be located two inches (2") below the invert of the inlet tee. Outlet tees shall be equipped with an effluent filter designed to handle both the daily flow volume and wastewater characteristics.

Tank Dimensions – All tanks whether pre-manufactured or constructed on-site shall be constructed so the length is at least one and one-half (1½) times the width and shall have two (2)

compartments. Tank compartment partitions will be located at a point not less than two-thirds ($2/3$) or more than three-fourths ($3/4$) the length of the tank from the inlet end. Compartment partitions will be constructed so a pass-thru hole or slot equal to or greater than the diameter of the inlet pipe is positioned below the liquid surface a minimum of 25% to a maximum of 50% of the total liquid depth. Total liquid depth for larger poured-in-place tanks shall be a maximum of sixty-six inches (66").

Construction Standards – The walls and bottom of poured-in-place septic tanks must be reinforced. Reinforcing can be accomplished by using either a minimum six inch by six inch (6" x 6") No. 10 gage welded steel reinforcing wire or fibrous reinforcing material conforming to ASTM specifications for such materials. Tank lids must be reinforced using three-eighths inch ($3/8$ ") steel reinforcing rods (rebar) which shall be spaced twelve inches (12") on center each way extending a minimum of two and one-half ($2\ 1/2$ ") inches and a maximum of three inches (3") from the outside edge of the tank lid. In general, the tank must be able to withstand a uniform live load of one hundred fifty (150) pounds per square foot in addition to all loads to which an underground tank is normally subjected. Additional reinforcement shall be required when the loads on a concrete tank are exceeded by subjecting it to vehicular traffic or when the top of the tank is placed deeper than three (3) feet below the finished grade. Walls, bottoms and lids of poured-in-place septic tanks shall have a minimum thickness of four inches (4"). Tank lids shall be constructed in one or two pieces and shall have securable, removable access openings located so the inlet and outlet tees can be readily accessed. Access openings shall be a minimum of fifteen inches (15") free space and a maximum of twenty-four inches (24"). Tanks with more than twelve inches (12") of cover must extend access openings to within twelve inches (12") of the ground surface.

Concrete Specifications - Concrete used for poured-in-place or pre-cast septic tanks shall have a minimum 28-day compressive strength of 4000 pounds per square inch. When pouring concrete, care should be taken to assure such operations are not done during freezing or otherwise inclement periods that could damage the integrity of the finished product. The finished product should have a smooth homogeneous consistency and finish. Vibrating the forms or mix may be helpful in eliminating "honeycombing" or "bridging" in the finished product. It will ultimately be the on-site sewage contractor's responsibility to assure the quality of the finished product.

Dosing Tanks and Dosing Devices

Dosing Required – On-site sewage management systems requiring five hundred linear feet (500') of field line or more must be equipped with a dosing device. Dosing can be accomplished using pumps or siphons. Systems requiring five hundred linear feet (500') but less than one thousand linear feet (1000') of field line are only required to have a single pump or siphon and a single absorption field. Systems requiring one thousand linear feet (1000') or more must have alternating pumps or siphons along with alternating absorption fields.

Construction Requirements – Dosing tanks shall meet the same construction materials and reinforcement requirements as septic tanks. One or two-piece dosing tanks may be used. When two-piece dosing tanks are used sections must be joined by using mastic, butyl rubber, or other pliable sealant that is water proof, corrosion resistant and approved for use in septic tanks. As with septic tanks, large capacity dosing tanks will need to be constructed on-site. There shall be no requirement as to length, width, or shape of the dosing tank. Dosing tanks may have a single compartment or if a partition is used it must have two four-inch diameter holes, or equivalent, located no more than twelve inches (12") above the tank bottom. For commercial applications, dosing tanks using pumps should be designed with a reserve capacity to allow adequate time for repair in the case of a pump failure, however, dosing tanks for siphons will not be required to have reserve capacity. All dosing tanks, however, must have an operating liquid capacity of 60% to 75% the interior volume of the absorption lines to be dosed. All dosing tanks shall have switches and alarms that notify the owner of a malfunction.

Riser and Lid Systems – Dosing tanks shall have a water-tight access cover at least twenty-four inches (24") in diameter extending to the ground surface or no more than twelve inches (12") below the ground surface. Riser and lid systems must be installed in accordance with the requirements listed in the Manual.

Pumps – When pumps are used to dose field lines, consideration must be given to the wastewater characteristics, desired discharge rate and total dynamic head required for the system. Total dynamic head is determined by adding the elevation difference between the lowest water level in the tank and the elevation of the discharge outlet to the total friction losses that occur in the pressure piping network. The desired pump must be able to overcome that amount of head or more at an acceptable discharge rate, to be satisfactory for use in the system.

Check Valves – When field lines are above the elevation of the operating water level of the tank, a check valve should be used to prevent the contents of discharge pipes from emptying back into the tank. When field lines are below the elevation of the operating water level of the tank, a hole or other vacuum breaking device should be placed in the discharge pipe before it exits the tank to prevent siphoning the remaining contents of the tank after the pump shuts off.

Electrical Wiring – The electrical connections should not be located inside of the tank or riser as this is a corrosive environment. The alarm switch must be placed on a circuit separate from the pump switches. All wiring and electrical components for systems requiring electrical components should meet the standards set forth in the National Electrical Code.

Siphons – Siphons are the non-mechanical alternative to pumps. As the dosing tank fills, head pressure increases in the tank to a point that will force the effluent thru the siphon which is a specially designed trap, creating suction in the discharge line that empties the contents of the dosing tank to the level of the siphon bell and sniff hole. Equilibrium is then re-established in the

line until the water level rises again to the level that the process starts all over again. As with pumps, single siphons are used for systems with more than 500 linear feet of field line and alternating siphons are used for systems with more than 1000 linear feet of field line. When installing siphons, care should be taken to ensure they are installed level and are primed with water.

Grease Traps

Grease Trap Required – Grease traps are required for any installation where the amount of grease in the effluent stream exceeds fifty milligrams per liter (50 mg/l). Grease traps are rarely used for homes. Their main application is in treating kitchen waste waters from motels, cafeterias, restaurants, hospitals, schools and other institutions with large volumes of kitchen wastewater. The purpose of the grease trap is to separate the grease from the other water carried waste which will protect the pipes in the system from clogging with grease and also help prevent clogging of the soil to some degree. Effluent from the grease trap must be deposited into the inlet of the septic tank along with the other water carried waste from the facility.

Construction Requirements – In Georgia, the minimum sized grease trap allowable is one hundred twenty-five (125) gallons. The sizing of grease traps should take into consideration the type of facility served and the estimated peak daily sewage flow. Grease traps may be constructed of any of the materials approved for conventional septic tanks. If an approved pre-cast septic tank is to be converted into a grease trap, the “t”s must be designed to extend vertically to within 12 inches of the tank floor and must reach well above the water line on the top. Grease traps shall be located, installed, and constructed so that the temperature of the sewage will be reduced to encourage congealing or separation of grease and for easy access for cleaning. Access to finish grade must be provided. The access covers should be gas tight construction, securable, and should be designed to withstand expected loads. Consult your local health department for assistance in sizing grease traps.

Maintenance – Grease traps should be cleaned regularly to prevent clogging. It is recommended that grease traps be cleaned when seventy-five percent (75%) of their grease retention capacity is reached. Typically, pumping frequencies range from once per week to once every two or three months depending on usage.

Aerobic Treatment Units (ATU's)

Pretreatment of High Strength Wastewater – Any facility that produces a waste stream with BOD₅ (biological oxygen demand) and TSS (total suspended solids) higher than 200 mg/L shall be required to pretreat the waste to reduce the BOD₅ and TSS to 200 mg/L or below before application to the absorption field.

Pretreatment Unit Selection - Pretreatment may be accomplished by using an appropriately sized

ATU that has been approved by the Department or by using a pretreatment unit that has been reviewed by the Environmental Protection Division for that specific application. EPD correspondence is required for the latter case. In either case, the wastewater flow volume and strength should be reviewed by a registered engineer as well as an authorized representative of the product manufacturer. Written correspondence from the designing engineer and product manufacturer is required.

Authorized Personnel – Any contractor installing an ATU must be authorized by the manufacturer. The contractor must be able to show proof of the authorization.

Absorption Fields

Absorption Field Dosing – Absorption field dosing is required when the total linear length exceeds 500 ft. For all systems that use a 4-inch distribution pipe, including: conventional, polystyrene, and bundled pipe, dosing shall be based on one-half gallon per linear foot. For chamber systems, dosing shall be based on 1 gallon per linear foot. Alternating absorption fields are required when the total linear length exceeds 1000 ft.

Absorption Field Sizing – Systems shall be sized according to the anticipated peak daily sewage flow for the facility to be served. For residential type facilities both single and multi-family, one hundred fifty (150) gallons per bedroom will be used to estimate the number of gallons per day sewage flow. Commercial systems shall be designed using the flow schedule found in Section J of the Manual. Table DT-1 of the Manual shall be used to size conventional absorption fields for commercial on-site sewage management systems.

System Design Limitations

System Size – Any on-site sewage system greater than 10,000 gallons per day or any project on a single property with a total daily flow of 10,000 gallons per day must be referred to the Georgia Environmental Protection Division for permitting. All on-site sewage management systems larger than 2,000 gallons per day must be designed by and shall bear the stamp of an engineer registered in the state of Georgia.

Wastewater Characteristics – Any wastewater flows containing chemicals that may be harmful to the environment (such as petroleum products, pesticides, or industrial processing agents) shall be referred to the Georgia Environmental Protection Division's Underground Injection Control Program for review and/or permitting.

System Installation and Inspection

Because commercial on-site sewage management systems are typically designed with advanced components such as cast-in-place tanks, pumps, time dosing panels, aerobic treatment units, large absorption fields, and grease traps it is critical that the conditions and specifications on the

construction permit issued by the local board of health and the approved engineered design are followed in detail. If the contractor is not able to install the system as permitted and designed, the local environmental health office must be contacted. Before installing a commercial system, the contractor must obtain a copy of the on-site sewage management system construction permit, the approved engineered design, and soil report for the property.

General Information

Commercial on-site sewage disposal systems shall adhere to all the standards established for residential systems unless otherwise specifically addressed in the permit. All solid pipe used in the installation of on-site sewage disposal systems shall be schedule 40 PVC or equivalent. Cast iron shall be considered to meet the equivalency standard.

Safety

Safety should always be a primary consideration in the construction of systems. When excavating trenches care should be taken to minimize the risk of injury to employees operating equipment and doing hand work in trenches. Trenches that exceed sixty inches (60") in depth should have walls stabilized with appropriate shoring devices.