

# Residential Contractor Exam Study Guide



*A passing score of 70% will be required for Residential 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](http://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.

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 residential 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 installers with preparation for the Residential Contractor Certification Exam. The study guide is not intended to replace the need for contractors to obtain a copy of Rules of the Department of Public Health, Chapter 511-3-1, as well as the Georgia Manual for On-site Sewage Management Systems.

On-site sewage management can take many forms. In whatever form, sewage is applied to the soil below the ground surface. The soil serves to clean wastewater by filtering out particulates, that is, solid material, plus removing bacteria and viruses. A properly designed and installed system will adequately treat and dispose of wastewater, and will ensure the protection of our drinking water resources for future generations. Because each site is different, this process requires a successful partnership between contractors, regulators, and property owners.

All septic tank Installers and Pumpers must be certified by the Georgia Department of Public Health. It is unlawful to install, pump-out, repair, or make an addition to an on-site sewage management system without the appropriate certification. In addition to the Residential Contractor Certification, the Department has developed additional certification modules that are required for specialized installations and work practices. These include:

*Commercial Contractor* – Required for on-site sewage system installations with a design flow rate greater than 2,000 gallons per day

*Drip Emitter* – Required for the installation of aerobic drip emitter systems.

*Area Fill Mound* – Required for the installation of an area fill system or a Wisconsin mound system.

*Pumper* – Required for septage removal and disposal. A “Septage Removal and Disposal Permit” from the county board of health is also required.

## Application Process

State rules and regulations specify a certain process for sewage system installation. As a contractor, you should be aware that no person may begin the physical development of a lot or structure - where an on-site sewage management system will be used without first obtaining an on-site sewage system construction permit from the Environmental Health section of the county health department. This process begins with the application for a permit by the owner or developer of the property.

The application shall include:

- ✓ The name and address of the property owner
- ✓ Location of property
- ✓ A site plan including on-site sewage system specifications

- ✓ Type of facility to be served
- ✓ Type of water supply
- ✓ Number of bedrooms and/or estimated gallons of sewage flow per day
- ✓ Soil information
- ✓ Additional information may be required such as: location of trash pits, water supply lines, utility lines, proposed swimming pools, out buildings, driveways or other paved areas, and any other features that may affect the suitability of the site.

Any facility having occupancy for two hours or more must provide an approved on-site sewage management system. All wastewater generated from a facility, including washing machine water, must be disposed of in an approved system. Pit Privies are an acceptable means of sewage disposal for a facility not served by water under pressure.

Also, any repairs, replacement, or additions to existing systems must be permitted and inspected. If pumping of the septic tank is required, this must be performed by a certified septic tank pumper sewage removal contractor in accordance with the regulations.

After having completed the application process, a site inspection is conducted.

The inspector considers information supplied on the application; including house location, soil characteristics, absorption rates, ground water conditions, rock conditions, lay of the land, bodies of water, streams and other factors which affect the suitability of the lot.

Notification of the completed permit will be given to the applicant when the permit has been approved.

The approved permit will include the minimum requirements for the septic system.

These requirements include tank size, trench length, depth and width, and any special conditions for the installation.

Absorption field lengths are generally determined by the number of bedrooms in the home or estimated gallons per day water usage and the percolation rate of the soils at the site.

Absorption field depths are determined by the soil conditions on the property.

It is your responsibility as a contractor to obtain a copy of the permit, site plan, and soil report (if applicable) prior to beginning construction of the on-site sewage system. It is also your responsibility to establish all applicable setback distances including but not limited to: property lines, wells, bodies of water, etc.

Allow time to review all requirements of the permit before beginning the installation.

If any conditions of the permit cannot be met, the county health department must be contacted prior to installation of the system.

### **Planning the Layout of the System**

When you arrive at the site spend adequate time evaluating the lot and planning your system installation prior to beginning construction. When you are considering the system layout, thought should be given to the following:

- ✓ The approved site plan
- ✓ The soil report for the property (if applicable)
- ✓ Location and elevation of the plumbing stub-out
- ✓ Slope of the land
- ✓ Property line locations
- ✓ Location of wells, springs, bodies of waters, streams, water supply lines, trash pits and other conditions that may affect the location of the on-site sewage management system
- ✓ Any other factors which may adversely affect your installation
- ✓ Replacement area for future absorption field

### **Setback Requirements**

The regulations require the following minimum setbacks for septic tanks and absorption fields:

*Wells and Springs* - A minimum of 50' from septic tanks and a minimum of 100' from absorption fields.

*Property Lines* - A minimum of 10' from septic tanks and a minimum of 5' from the absorption fields for property served by public water. Absorption lines installed on property served by individual wells must be 50 feet from adjacent property lines unless development is preplanned to maintain the required buffer distance between wells and on-site sewage management systems on adjacent properties.

*Bodies of Water or Impoundments* - A minimum of 25' from septic tanks and a minimum of 50' from absorption fields.

*Streams or Tributaries* - A minimum of 25' from septic tanks and a minimum of 50' from absorption fields.

*Ponded Wetlands* - A minimum of 50 feet for absorption fields.

*Buildings with a Basement* - Shall require a septic tank and absorption field placement a minimum of 10 feet from the foundation.

*Buildings without a Basement* - Absorption field placement no less than 5 feet from the foundation and septic tank placement no less than 10 feet.

*Surface Drainage Ditch* - Septic tanks must be 15' from a drainage ditch. Septic tanks and absorption fields must be a minimum of 15' from trash pits and embankments.

*Subsurface Drainage* - A subsurface drainage system should come no closer than 10 feet upgrade or 30 feet downgrade from an absorption line. Examples of subsurface drainage includes curtain drains, french drains, tile drains, and underdrains.

*Water Supply Lines* - If the water supply line crosses or comes within 10 feet of the absorption field, the water supply line shall be installed at least 12 inches above the top of the aggregate layer of the absorption field line and shall be encased in single-length larger diameter water pipe, such as 2" PVC. The minimum distance a septic tank can be from a pressure water supply line is 10 feet.

### **Septic Tank Specifications**

After the permit has been issued, any grading, filling or other site modifications that would adversely affect the sewage system may render the permit void.

The septic tank is the first component of an on-site sewage management system.

Septic tanks are generally pre-cast with concrete and delivered to the construction site. However, with approval of the county board of health, septic tanks can be poured in place when necessary. Plans and specifications for the poured-in-place septic tanks must be submitted to the health department prior to construction.

All septic tanks, pre-cast or poured in place, must be constructed to standards set by the state and must have two compartments with the first compartment designed to contain at least 2/3 of the total liquid capacity of the tank.

Septic tanks may be constructed from material other than concrete when approved by the departments Technical Review Committee.

Regardless of the tank construction the minimum liquid capacity of a septic tank for one, two, three, or four-bedroom single family home shall be not less than one-thousand gallons.

The septic tank capacity shall be increased by two hundred and fifty gallons for each additional bedroom over four.

Where garbage grinders are used, the septic tank capacity shall be increased by fifty percent.

The primary purpose of the septic tank is to provide a means of settling out of solid matter from the liquid.

By design, the outlet of a septic tank should be two inches lower than the inlet.

A properly installed septic tank must be placed on undisturbed earth, must be level, and constructed to prevent surface water from entering the tank.

Once installed, the tank should have a minimum of 6 inches of cover.

If more than 12 inches of cover is to be placed over the tank a riser will be required to bring access within 12 inches of the ground surface.

An approved filter must be installed on the outlet end of the tank.

The use of a grease trap shall be required for facilities which may introduce grease into a system in excess of 50 milligrams per liter.

When grease traps are required, the effluent from the grease trap shall be deposited into the septic tank and not directly into the absorption fields.

Beginning at the house all solid pipe and fittings shall be schedule 40 PVC or equivalent, except for the inlet and outlet tees, which shall be ASTM 3034 rated or equivalent, and shall be a minimum of 4 inches in diameter. All septic tank openings must be sealed to prevent water, soil or root intrusion.

### **Pump Tank Specifications**

If gravity flow is not possible to access the desired absorption field location for any type of system, an effluent pumping system may be required. Pumps used for on-site sewage management must meet the following requirements:

- ✓ Pumps must be submersible and wastewater approved.
- ✓ The pump must be capable of delivering the required flow at the designed total dynamic head.
- ✓ When pumps are used they cannot be placed inside the primary septic tank. Pumps must be placed in a separate pumping chamber.
- ✓ All wiring and components of the pumping system shall conform to the National Electrical Code.

When pumping is required, specific installation instructions will be noted on the permit.

These type systems may require additional instruction and you should work closely with the inspector when installing these systems.

Dosing tanks for residential systems shall have sufficient volume to provide the desired dosing volume plus reserve volume. The reserve volume is equal to the estimated daily wastewater flow.

Pumps shall have alarms that notify the owner of malfunction. Pumps and alarms must be placed on separate circuits. The electrical connections should not be located inside of the pump tank or riser.

### **Absorption Fields**

The next component of an individual on-site sewage management system consists of septic absorption field lines, or trenches.

There are several different types of absorption field lines available.

Starting with the aggregate system, a system that uses an approved distribution pipe surrounded by gravel or other approved aggregate material.

An aggregate, or gravel system, must be installed in accordance with the following minimum design and construction criteria:

- ✓ The aggregate itself shall be ½" to 2" inches in diameter and pre-washed.
- ✓ Absorption lines and trench bottoms shall be true to grade, that is level for their entire length, and installed to run along the contour of the land.
- ✓ Trench bottom depths shall be based on what is indicated on the permit.
- ✓ Absorption trenches shall be no more than 36 inches wide, and spaced a minimum of 7' apart, center to center.
- ✓ On average, 15 tons of gravel aggregate per 100 linear feet of absorption field at a width of 36 inches will be needed to maintain a 12-inch depth throughout the system.
- ✓ The minimum depth of aggregate shall be twelve (12) inches with six (6) inches below the perforated pipe and filled to two (2) inches above the pipe.
- ✓ Perforated pipe shall be laid in the center of the trench with the perforations oriented toward the bottom of the trench.
- ✓ A layer of pervious building paper, straw, or similar permeable material approved by the Department's Technical Review Committee shall be placed over the aggregate before back filling.
- ✓ A minimum of 6 inches to 12 inches of earth cover is required over absorption lines.
- ✓ Schedule 40 PVC or equivalent solid pipe and fittings with sealed, watertight, root resistant joints shall be used for horizontal and vertical changes in direction or grade and to cross under roadways or paved areas. Sewers shall be laid on a firm foundation, installed on a grade to insure a self-cleaning velocity, and be a minimum of 4 inches in diameter. Sections of solid pipe shall not be considered in determining the total absorption trench bottom area.

- ✓ Excavation for absorption trenches in soil other than sands should not be conducted when wet, due to the potential irreversible damage to soil structure, such as compaction and smearing.
- ✓ Absorption trenches from conventional septic tanks must be installed a minimum of 2 feet above any permanent or seasonal groundwater table, rock, or other impervious soil layer.

### Three Standard Configurations of Aggregate System Installations

An aggregate (gravel) system may be installed in three standard configurations. These configurations are: the Level Field Method, Serial Method, or Distribution Box/Device Method.

#### 1) *Level Field System*

On level or sloping topography of five percent (5% or less, the level field method may be used. When this method is used, the absorption field shall be installed level, with all absorption lines interconnected to form a continuous system. A standard tee fitting or approved distribution device shall be used to interconnect the absorption lines. The invert of the absorption line shall be at least 6 inches lower than the invert of the septic tank outlet. An absorption field existing of a single absorption line up to 125 feet in length may be installed without interconnection.

#### 2) *Serial Field System*

On sloping topography, the serial distribution method may be used. When this method is used, level absorption trenches shall be constructed parallel along the ground contours. The sewer from the septic tank shall enter the uppermost absorption line, or trench, and connect at any point in the line so all effluent from the septic tank is discharged into the first absorption line.

It is important that the overflow sewer between the first and second trench be a minimum of four inches below the septic tank outlet. This is necessary to prevent effluent from flowing back into the septic tank when the first absorption trench fills to capacity prior to overflowing into the second trench.

Adjacent absorption lines shall be successively connected by means of overflow sewers of 4-inch diameter, schedule 40 PVC pipe or equivalent and installed at any point along the absorption line so that each absorption trench fills with effluent to the full depth of the aggregate before the effluent flows through the overflow sewer to the next trench.

The soil between absorption trenches must be left undisturbed. This is particularly important at the point an overflow sewer leaves an absorption trench. Excavation for the overflow sewer shall be dug no deeper than the top of the aggregate in the absorption trench, so that an undisturbed block of earth will remain in place for the full depth of the aggregate. This will allow each absorption trench to reach full capacity before overflowing into the next trench in the series of trenches. The PVC overflow sewer pipes shall be laid on this undisturbed earth, then have a minimum of six inches of earth cover. All pipe and fittings of the overflow sewer shall be NSF International schedule 40 PVC or equivalent.

### *3) Distribution Box Method*

On level or sloping topography, the distribution box method may be used. The distribution box must be set on a level concrete pad as a foundation, or on undisturbed earth. If set on soil, the box must have concrete poured at its base, extending at least twelve inches beyond the walls of the box to insure against tilting.

Installation of the distribution box shall be made to provide equal flow to each absorption line extending from the box. This is done by making sure the box is absolutely level. The best method of leveling a distribution box is by filling it with water.

The top of the distribution box shall have a minimum earth cover of six inches, but no more than twelve inches unless provisions are made for easy access to the distribution box.

The sewer pipe from the septic tank shall enter the distribution box and terminate inside the distribution box with an elbow turned downward to form a submerged discharge of the effluent below normal water level. This will minimize turbulence in the distribution box. A baffle may be used, instead of an elbow, if the same function is accomplished.

Absorption lines of equal length shall be connected to distribution box outlets by watertight independent sewers consisting of four (4) inch schedule 40 PVC pipe or equivalent. Each absorption line extending from a distribution box system shall not exceed one hundred twenty-five feet in length.

All independent sewer pipes coming out of the distribution box shall be installed level at the same elevation for two feet. Beginning two feet from the distribution box to the beginning of the perforated pipe at the start of each absorption trench, a minimum of two inches downward grade is required.

Absorption trenches for a distribution box system can be installed level or on a uniform change in grade of no more than four (4) inches of fall per one hundred (100) feet. This is the only exception to the absorption trench leveling requirement.

The Department's Technical Review Committee may approve other distribution devices for use with conventional septic tank systems.

### **Chamber System**

The chamber system is another septic absorption line option that may be used instead of aggregate, or gravel systems. Trench excavation and spillover - or overflow pipe - construction is similar to that of the aggregate system. However, these systems do not require the use of aggregate.

Chamber system means a system using chambers of molded polyolefin plastic. The plastic is shaped to form a hollow structure with an exposed bottom area for infiltration of effluent into adjoining bottom and sidewall soil areas.

Chambers may be of different sizes and configurations to obtain desired surface area. However, on average each panel is 4 feet in length.

Reduction in absorption field size may be given for chamber system. However, reductions should not be automatically assumed and you should check with the department for specific information.

Chamber leaching systems provide flexibility and may be adapted to most design situations.

Installation instructions for various chambers will be based on specific manufacturers' recommendations which have been reviewed and approved.

All chamber systems must be installed in accordance with the following minimum standards:

- ✓ All chambers shall be designed and constructed to support vertical uniform loading of 600lb/sq.ft. on the top of the chamber without damage or permanent deformation.
- ✓ All chambers shall be designed and constructed to provide ports, slots or other similar openings on sidewalls to allow air movement and effluent access to lateral field trench sidewall absorption surfaces.
- ✓ All chambers shall be designed and constructed to be interlocking to allow continuous installation of chambers, and be provided with acceptable end plates, caps or other necessary fittings and connectors.
- ✓ All chambers shall be designed to accommodate at least one inspection port of a minimum internal dimension of four inches centrally located in the top of the chamber.
- ✓ All such chambers offered for sale or used in Georgia shall bear the imprint, stencil, or other acceptable means of permanent marking, the manufacturers' name or number assigned to the manufacturer's plans and specifications approved by the Department. This imprint, stencil, or other marking shall be located beside the observation port.
- ✓ Metal chamber systems are prohibited.

- ✓ Excavate a 36-inch wide trench, remove debris, and level the trench bottom before installation of chamber units.
- ✓ When back-filling a chamber system absorption line, you should fill the sidewall areas first and pack down the fill by walking along the edges of the chamber units prior to placing soil over the top of the chambers.
- ✓ Chamber absorption lines should have 6 to 12 inches of earth cover over the chamber units to achieve the required load rating.

### **Polystyrene Aggregate**

Polystyrene aggregate may also be used in absorption trench installations.

Approved polystyrene aggregate materials should treat effluent in absorption fields similarly to approved gravel aggregate systems.

When installing a polystyrene aggregate system, the protective sleeve to hold the aggregate in place must not be cut.

Only the specific configurations approved by the Department may be installed.

### **Aerobic Treatment Units and Advanced Treatment Systems**

The use of aerobic treatment units may also be required in special situations. These units must meet the testing criteria and performance level specified by ANSI/NSF standard No. 40 for Residential Wastewater Treatment Systems

Aerobic treatment units must meet the following requirements:

- ✓ All aerobic treatment units must be approved for used by the Departments Technical Review Committee.
- ✓ Must be installed by an authorized representative of the manufacturer.
- ✓ These type installations require special instruction and may require additional site evaluations.
- ✓ The local health department can provide additional information about these units.

### **System Installation**

If you encounter conditions making it impossible to meet the requirements of the permit, contact the health department for help or assistance.

### **Final Inspection**

Upon completion of the system installation, the Environmental Health Section of the Health Department must be contacted for a final inspection.

The contractor or responsible representative of the contractor must be on site at the time of inspection of the system.

As a certified contractor, you should be aware that no person may cover or use an on-site sewage management system until final inspection has been made and written approval has been issued. Failure to comply with this regulation, or any of the departments' regulations for on-site sewage management systems, will result in decertification.

In addition to decertification, you should be aware that it is a misdemeanor to cover or use a septic tank system prior to receiving a final inspection and approval from the health department.

Inspection times for final approval of a completed septic system will vary from county to county. You should contact your local Environmental Health Section for available times for inspections.

When the system installation has been completed, you should have a copy of the permit in hand in order to supply the necessary information, which may include;

- ✓ Your contractor certification number
- ✓ The permit number and time the inspection is needed.
- ✓ The subdivision name, lot number, street or road name.
- ✓ The installer's name.
- ✓ The property owner's name.
- ✓ A phone number where you can be reached.

If you realize that you will not be ready for inspection at the time requested, you should contact the health department to prevent an unnecessary site visit. This courtesy will help the inspector make the best use of time and insure inspections are conducted as close to requested times as possible.

At the time of inspection, final approval or denial will be issued by the inspector.

After receiving final approval, the system can be back-filled.

The back-fill material should not contain large stones, stumps, broken masonry or other such materials which may adversely affect the functioning of the system.

Records of sewage system installations are maintained at the local Environmental Health Section and may be obtained upon request.

As a certified contractor, you will be required to be recertified during the even year renewal period and meet the continuing education requirements.

## **Conclusion**

Because of many factors, including its pristine environment, the State of Georgia enjoys one of the highest growth rates of any state in the nation. Each year more than 40,000 new on-site sewage systems are installed in Georgia.

This number - added to the more than 600,000 existing on-site sewage systems - yields more than 75 million gallons of wastewater being discharged into the soils of our state each day.

Now, more than ever before, our natural resources are in a precarious state. We must all do our jobs well to ensure that our home environment is safe for our families and the families of the future.

As on-site sewage contractors, you play a vital role in a partnership that will insure our state will be a healthy place to live and work for generations to come. The regulations presented in the Georgia On-Site Sewage Manual are our game plan. The public health inspectors are our coaches, and together we form the team that will make this partnership successful.