Septic System Self-Installer Study Guide

What is the Septic System Self-Installer Competency Test?
This is a test designed to make sure that you know all of the relevant regulations, construction standards, and other logistics that relate to owning and installing your own septic system. This test is **mandatory** for all aspiring self-installers. This study guide is intended to streamline your studying process and clarify what you will need to know for the test. The information you will be required to know and act upon can be found in two document: the Regulations document and the Construction Standards document. These documents are lengthy and dense, and so this study guide contains information on what sections are important for you to know and which you can skip over.

How do I make an appointment to take the Septic System Self-Installer Competency Test?
You must call the Environmental Health Office at 406-751-8130 to schedule an appointment to take the test and review it with a sanitarian. You may call the office at any time between 8AM-5PM Monday through Friday, except for Wednesdays: meetings take place on Wednesday mornings, so don't call before 10AM.

Your actual appointment, meanwhile, will take place, Monday through Friday between 8AM-3PM (except for Wednesday mornings). 3PM is the absolute latest you should arrive due to the time it takes for you to take the test and review it with a sanitarian.

Where to find the two main reference documents, which are the "Regulations" and the "Construction Standards":

These 2 important reference documents are located online. Follow these steps to reach these resources:

To immediately find these documents, go directly to the following link:

http://flatheadhealth.org/environmental-health/sewage-and-septic/
Under the heading Sewage Treatment Systems and Services, you will find the "Flathead County Regulations for Sewage Treatment Systems" and "Sewage Treatment System Design and Construction Standards". These files are in PDF format. Click on them to download them and then open them.
If your computer cannot open them, you may need to download Adobe Acrobat Reader at this link:
https://get.adobe.com/reader/
This is completely free and without risk of viruses. Uncheck the boxes under the "Optional Offers" heading if you do not wish to include them in your download.

To navigate through the Health Department's website to reach these documents, follow these steps:

First, go to www.flathheadhealth.org to reach the main page for the Flathead City-County Health Department.
Then, go to the bar near the top of the page and find "Departments" in that bar. Either click on "Departments" and find Environmental Health in the list of departments on the left side of the page, or hold your mouse over "Departments" until you see a menu appear in which Environmental Health can be found and clicked on.
Regardless, click on "Environmental Health".

Look at the column on the left side of the page that lists, alphabetically, different programs managed by Environmental Health. “Sewage and Septic” can be found near the bottom of the list in this column. Click on “Sewage and Septic”.

Under the heading “Sewage Treatment Systems and Services, you will find the “Flathead County Regulations for Sewage Treatment Systems” and “Sewage Treatment System Design and Construction Standards” documents. These are in PDF format. Click on them to download them and then open them. If your computer cannot open them, you may need to download Adobe Acrobat Reader at this link: https://get.adobe.com/reader/
This is completely free and without risk of viruses. Uncheck the boxes under the “Optional Offers” heading if you do not wish to include them in your download.

What to know from the reference documents:

Regulations Document

The Regulations document is the shorter of the two (24 pages long) and nearly all of its sections contain important information regarding your septic system.

Overview of "Regulations" Document Sections

The "Purpose of Regulations" section is important because it lays out the public health and environmental principles behind why septic systems must be designed the way they are.

Sections 1 is mostly legal information that, while not necessarily *always* important to keep in mind, lay out the basic legal framework for how septic systems are permitted, managed, regulated in Flathead County. Additionally they describe ways in which you must comply with Health Dept. requirements and inquiries.

Section 2 is very brief and merely gives the effective date of these regulations and states that the regulations may be updated by the Board of Health at any time.

Section 3 is very important due to containing many relevant definitions for septic systems and the related permitting and approval processes.

Sections 4-6 are related to applications and permitting, and should be reviewed thoroughly so that you grasp the permitting process and related issues such as expiration, revocation, and permit denials.

Section 7 is largely irrelevant to self-installers since it discusses hired Licensed Contractors. However, self-installers must still follow the same requirements and construction standards for their septic system as any contracted builder.

Section 8 is largely irrelevant to self-installers, as the business you visit to purchase your septic tank will also take care of the design specifications and employ the Certified Designers discussed in this section.

Section 9, regarding Inspection and Operations of sewage treatment systems, is very important to understand how you interact with the Health Department in septic system matters and should be reviewed thoroughly.

Section 10 discusses minimum requirements for the different classes (1, 2, and 3) of septic systems. It is very important to identify which class your system will belong to and what requirements go with it. See section 3, Definitions, for class descriptions.

Section 11 discusses non-discharging toilets and portable chemical toilets, which are irrelevant to you unless you are installing either of those. Standard septic systems are not either of these.

Section 12 is one sentence long and will only be relevant to you in exceptional situations where public authorities must intervene to protect public health and environmental quality.

Section 13 discusses deviations from Regulation and Construction requirements, and how they are requested (by you) and reviewed and granted or denied (by the Health Dept.). This section is only important if you will want/need to deviate from regulations and construction standards in your septic system.

Section 14 discusses appeals for denied permits, and for variances from the regulations and construction standards. This section will only be relevant to you if your permit is denied, or if you must deviate from the regulations and construction standards in the design and installation of your septic system

Section 15 discusses violations, penalties, and enforcement of septic system issues and should definitely be reviewed since you may find yourself, even by accident, in a position where violations must be resolved, penalties may be levied, and enforcement may take place.

Section 16 discusses changes to the regulations themselves and will most likely be completely irrelevant.

The most important Sections (but NOT the ONLY ones that MIGHT have relevant information to you) are therefore: 3, 4, 5, 6, 9, 10, and 15.

Most Important Concepts from Most Important Sections:

Section 3:
Know the definitions of:
-Bedrock
-Class 1, 2, and 3 systems
-Conventional System
-Failing Sewage Treatment System
-Fill
-Gray Water
-Impervious (Restrictive) Layer
-Individual Sewage Treatment System
-Permit
-Septic Tank
-Standard Soil Absorption Trench

Section 4:
-You must fill out an application to get a permit from the Flathead Health Dept. to construct, alter, repair, or operate a private septic system.
-All septic systems in Flathead County must have Uniform Pressure Distribution as a part of their design. This will be taken care of by the company that provides parts and designs for your septic system (Glacier Precast Concrete or Flathead Concrete)
-The Health Dept. will not issue a permit until all relevant data and plans have been received and processed, and permits are not active until paid for.

Section 5:
-Permits expire for systems that are not installed and approved after 12 months.
-Permits for systems that are installed and approved, but not actually used, expire after 3 years.
-In both of these cases, you may reapply for a permit.
-Do not conduct any actions on a septic system without a valid and current permit.
-Do not alter plans or construction of your system without Health Dept. Approval.

Section 6:
Permit *denials* typically result from:
-Designs that violate regulations and construction standards
-Insufficient data provided about the system to determine if it complies
-Non-payment of permit fees
-Insufficient space to possibly replace the septic system, or being too close to any existing system
-Nearby (200 ft. of property line) availability of public sewer system (unless cost or field conditions prohibit public sewer use)

Section 9:
-Construction may begin after the permit has been issued.
-All systems must be given a final inspection by Health Dept. staff before they are backfilled (buried).
-Permits also allow the Health Dept. to inspect the system at any point in its lifetime, even if ownership is changed.
-The inspector, during final inspection, will compare the system as it has been constructed with the permit to look for consistency between plan and execution.
-Flaws in construction and operations found by the inspector must be corrected within 15 days and a re-inspection will be done to check the corrections.
-You, as the property owner, are responsible for operating, maintaining, and repairing your system.
-The Health Dept. may need you to provide inspection, maintenance, cleaning, and testing documentation.
-Septic systems should only receive household water wastes from toilets, baths, showers, sinks, and laundry. **DO NOT PUT THE FOLLOWING INTO YOUR SEPTIC SYSTEM BY DUMPING DOWN DRAINS, etc:** Photography chemicals, industrial waste, large quantities of household chemicals, paper towels, baby wipes, feminine hygiene products etc. These can clog your system, pollute the environment and kill the microbes that your septic system needs to work properly. **Toilet paper <u>may</u> go into your septic system.**
DO NOT CONNECT THE FOLLOWING TO YOUR SEPTIC SYSTEM WITH PLUMBING:
Roof drains, groundwater, surface runoff, gutters, sump pumps, etc.
-Gray water, i.e. water from laundry and interior sinks, **MUST** be connected to the septic system.

Section 10 info is on next page due to the large table of information included in it.

Section 10: The following table of vertical and horizontal distances is extremely important.

TABLE 1 - MINIMUM SETBACK AND SEPARATION DISTANCES

FROM:	TO: Septic Tank pump Chamber other Sealed Components (feet	To: Absorption System (feet)
Well [a]	50	100
100-year Floodplain	5[b]	100
Surface Water [c]	50	100[a]
Foundation Wall	10	10
Water Lines	10	10
Property Lines [d]	10	10
Absorption System	10	---
Slopes in excess of 25%	10	25
Groundwater Table [e]	(e)	4 [a][g]
Bedrock [e]	(e)	4 [a][g]
Impermeable or Impervious Layer [e]	(e)	4 [a][g]
Subsoil Drains	10	10
Cisterns [a]	25	50

(a) Variances to these setbacks will not be considered for new construction.

(b) Forcemains for sewage and sewage effluent are excluded with the following conditions:

(i) The forcemain originates from a septic tank or other approved treatment device and terminates to a drainfield or other approved subsurface soil distribution system in compliance with the minimum setbacks provided in Table 1.

(ii) The forcemain is to be constructed of High-Density Polyethylene (HDPE) Sewer Pipe and must have a pressure rating of at least 200 PSI.

(iii) It is preferable the pipe not be joined together in the floodplain. If necessary, pipes shall be joined to one another and to HDPE fittings by thermal butt-fusion. Thermal butt-fusion of pipes and fittings shall be performed in strict accordance with procedures recommended by the pipe manufacturer.

(iv) Hydrostatic and leakage testing shall be completed on all constructed forcemains for a minimum period of 2 hours tested at one and one half times the operating pressure or 60 psi whichever is the greater value. No loss of pressure (less than five psi will be allowed).

(c) Surface Water - This distance shall be measured horizontally from the high water mark.

(d) For proposed installations where any portion of the sewage treatment system will be located less than 10 feet from the property line, written permission must be obtained from the adjoining owners.

(e) Groundwater Table - Depth to groundwater table shall be measured during its highest period of occurrence (high seasonal groundwater level).

(f) The Department may require that special design criteria and construction techniques be utilized when septic tanks, pumping chambers and sealed lines are proposed to be located within two (2) feet of the groundwater table, bedrock, impermeable soils, or extremely coarse soils (gravels).

(g) 4 feet - The separation to groundwater, bedrock and/or impermeable or impervious layer shall be measured from the infiltrative surface.

Section 10, Continued:
-ONLY parts of a septic system designed for traffic/heavy loads may be placed under driveways or other traffic/heavy loading areas. Drainfields (absorption systems) may NEVER be placed where vehicles will drive and park. Therefore, only septic tanks and connections from the home may possibly exist where traffic takes place.
-NO PART of ANY septic system may be placed where future development of structures like garages, sheds, and expansions will occur.

Section 15:
-The list of violations in 15.1 is important to know.
-Notices of violations will be given out and, if not corrected quickly (15 days or whatever else has been worked out with the Health Dept.), will be followed up with penalties.
-Approval and permitting based on false or insufficient information will be withdrawn and penalties will apply.
-Violation penalties range from $50 to $500 per day, adding up as days pass.

Construction Standards Document

Chapter 1:
Keep in mind section 1.1.1.2 and the use of the words “shall”, “must”, and “may not” for mandatory things and “should”, “may”, “recommended”, and “preferred” for non-mandatory things.

Section 1.1.2 is important for its description of the general septic system layout, and what uniform pressure distribution is and why it must be used in Flathead County. The third paragraph of this section may be skipped unless you are going to install a non-standard system.

Section 1.1.3 may be skipped unless you are going to install a non-standard system. It is also missing the definition and purpose of an elevated sand mound system, which is a system meant to put extra distance between drainage pipes and a limiting layer by adding an extra layer of sand between them.

Section 1.2 is filled with important definitions. The ones you should **NOT** worry about are: Advanced treatment, aerobic wastewater treatment unit, BOD5, building drain, composting toilet, holding tank, horizon, incinerating toilet, industrial wastewater, mottling (redoximorphic features), plasticity, proprietary system, qualified site evaluator, soil consistence, soil profile, soil texture, TSS, uniformity coefficient, and wet well.
Understand the rest of the definitions.

Chapter 2:
All of chapter 2 may be skipped over, as these are matters taken care of by a sanitarian or other qualified person that initially assesses the site and shouldn’t matter much by the time you are planning to take the self-installer test or getting a permit for your system.

Chapter 3:
Section 3.1.2 is worth reading to get an idea of your daily flow rate. The rest of 3.1 and all of 3.2 may be skipped.
Section 3.3 is most likely irrelevant- if you have one of the water treatment systems described, it is recommended that they are NOT plumbed into the septic system, even though this section states that they may be.

Chapter 4:
All of Chapter 4 is **very important** since it provides specific necessary info about how collection, pumping, and effluent distribution parts of your septic system must be designed. Keep in mind what parts of your septic system are being referred to in the different parts of chapter 4. Be prepared to apply the requirements described in this chapter to diagrams of septic systems and your own system as you are installing it.

Chapter 5:
All of Chapter 5 is **very important** since it describes how the septic tank itself must be designed. Be prepared to apply the requirements described in this chapter to diagrams of septic systems and your own system as you are installing it.

Chapter 6:
Look at the table of contents on page 3 of the Construction Standards document. Notice that chapter 6 describes many different kinds of soil absorption systems. If you are installing a normal standard system, only section 6.1 applies to you (**and is very important**) and the rest may be skipped completely. Elevated sand mounds, the next most common, are found in section 6.7 and the rest of the sections may be skipped entirely. The same pattern holds for whatever type of absorption system you will be installing. Be prepared to apply the requirements described in whichever part of the chapter is relevant to you to diagrams of septic systems and your own system as you are installing it.

Chapters 7, 8, and Appendices A, B, and C may be skipped completely.

Appendix D is important for its descriptions of mandatory Owner's Manuals, Installation Manuals, Operation and Maintenance Manuals, and As-Built Plans. The last section about Proprietary and High Strength Wastewater Treatment Systems may be skipped.

Appendix E has numerous diagrams of different designs of septic systems. Only the diagram(s) of the kind you'll be building will be relevant to you.

Practice Questions, Tables, and Diagrams

NEARLY ALL OF THE QUESTIONS HERE ARE REPEATED IN EXACTLY THE SAME WAY ON THE TEST. THEREFORE YOU SHOULD KNOW ALL OF THE ANSWERS TO THESE TO SUCCESSFULLY PASS THE TEST, AND TO HAVE THE KNOWLEDGE NEEDED TO INSTALL AND OWN YOUR SEPTIC SYSTEM.

1) How often should you have your septic tank pumped?
You should have your septic tank pumped every 3-5 years. Remember this for the test.

2) How often should you check and clean your septic system filter?
You should check your septic system filter about every 6 months and clean it at least once a year.

3) How does your septic pumping system turn on, turn off, and sound an alarm if it is too full (which indicates a malfunction)?
See the diagram on page 37 of the construction standards: there are 3 float switches set at different heights. They turn your system on and off as your tank fills up, and sounds an alarm if it fills beyond a certain point. The answer for the test is:
The 3 float switches in the pumping chamber.

4) Where will your weep hole be placed?
A weep hole is a small hole made somewhere in your pumping chamber piping. Some possible places where it might go could be: the riser pipe, an upper elbow, or a lower elbow. Discuss with the company that plans out your septic system (Glacier Precast or Flathead Concrete) where your weep hole will go and provide an answer on the test like "in the riser pipe" or "in the upper elbow" or "in the lower elbow". Where YOURS will be depends on where your drainfield is relative to the pumping chamber.

5) Can you modify or repair a septic system without a permit from the Flathead City-County Health Dept. (Regulations 4.1)?

6) After how long does a permit expire for a system that hasn't finished being installed and approved (Regulations 5.1)?

7) Cleanouts are recommended within ___ feet of the building, at angles greater than ____ degrees, and for continuous pipe runs greater than ____ feet in length (Construction Standards 4.1.2.3).

8) At least what height of squirt must you get out of any orifice smaller than 3/16 of an inch (a)? What about orifices 3/16 of an inch or larger (b)? (Construction Standards 4.2.3.3 E)
(a) Smaller than 3/16 of an inch_____
(b) 3/16 of an inch or larger_____

9) YOUR septic system is connected to a _____ bedroom house. What capacity should your tank have? _____ Gallons

Fill in the Tables

10) Put a checkmark in the table where something must/can or must not go into your septic system.

	Must/Can	Must Not
Toilet Water/Waste (Blackwater)		
Baby Wipes		
Paper Towels		
Drain Cleaner, Pesticides, Paints, Household Chemicals		
Sink, Laundry, Dishwasher, Bathing Water		
Feminine Hygiene Products, Diapers, Condoms		
Gutter, Roof Drain, and Sump Pump Effluent		
Medications, Antibiotics		
Toilet Paper		

11) Fill in the table of minimum setback and separation distances.

MINIMUM SETBACK AND SEPARATION DISTANCES (in Feet)	Put answers in feet.	Put answers in feet.
FROM:	TO: Septic Tank, Pump Chamber, other sealed components	TO: Drainfield (Absorption) System
Well		
Foundation Wall		
Water Lines		
Property Lines		
Drainfield (Absorption) System		----------

True or False

_____12) In standard gravel trenches, orifices should point upward (be on top of the pipe) for normal operation.

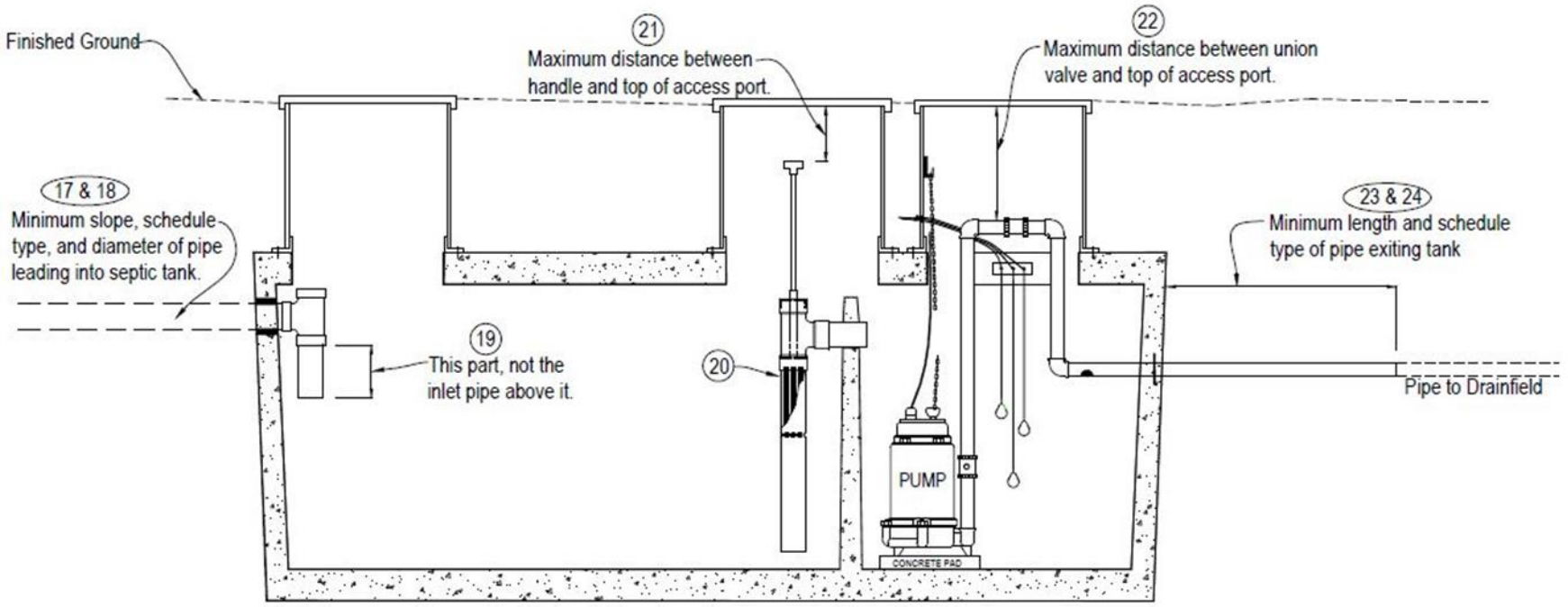
_____13) The union valve in the pumping chamber should be within 18 inches to the top of the access port.

_____14) Garages, home expansions, sheds, etc. may be built over some parts of a septic system. (Regulations 10.2 (3))

_____15) Forcemains (pressurized sewers) shall be bedded in sand or other fine grained material, free of gravel over 1 inch in size, six inches above and below the pipe (Construction Standards 4.1.4)

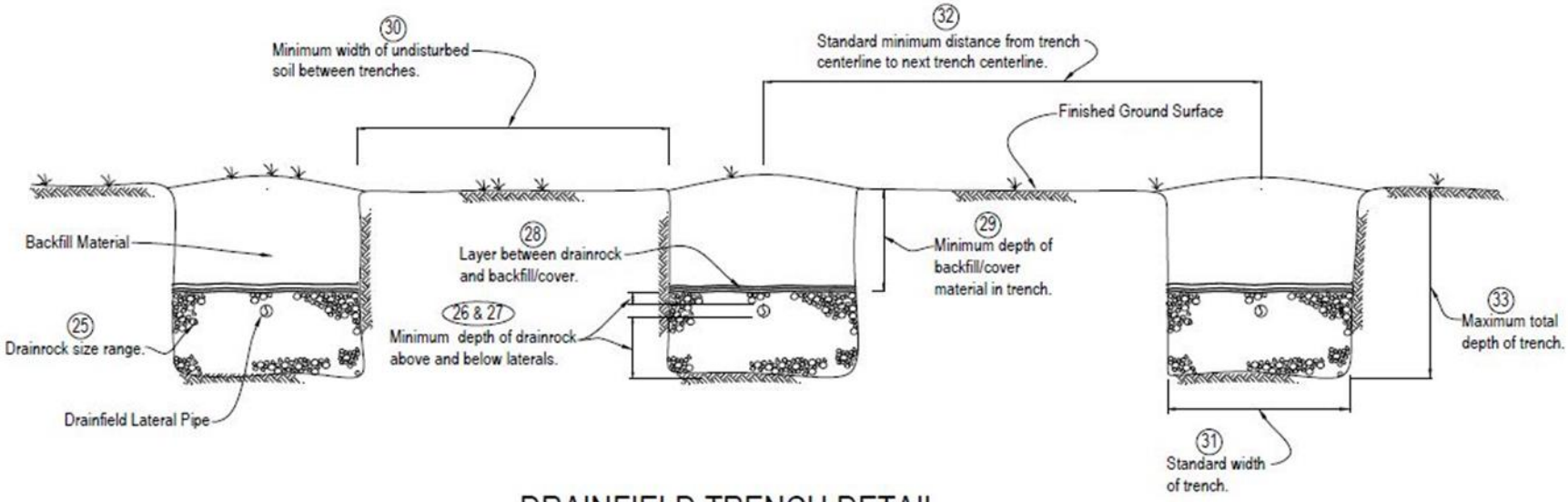
_____16) Flathead Health Dept. Staff can inspect a finished, installed septic system at any time (Regulations 9.2)

Diagram and Other Questions: On the diagrams below, certain parts of the septic system are numbered. Look at what the number is indicating in the diagram, and then find the corresponding numbered question in the pages after the diagrams. Provide an answer to the questions as needed.



1500 GALLON
SEPTIC TANK/PUMP CHAMBER

SCALE: NONE



DRAINFIELD TRENCH DETAIL

SCALE: NONE

17) What is the minimum slope of the pipe that feeds into the septic tank from the house as shown in the diagram? (Construction Standards 4.1.2.1)

18) What schedule type and diameter of pipe should be used to feed into the septic tank as shown in the diagram? (Construction Standards 4.1.1.7 and 4.1.2.1)

19) Identify this structure that is connected to the inlet pipe and extends below the surface of the liquid in the tank. It is not just called the "inlet". (Construction Standards 5.1.3.2)

20) What part of the septic system is being pointed to here in the diagram, where wastewater moves from the septic tank to the pump chamber? (Hint: It's not just the "outlet".) (Construction Standards 5.1.5)

21) (Not a question) The preferred maximum distance between the top of the filter handle and the top of the access port is 12 inches. Construction Standards 5.1.5.4 says 2 inches instead, but the right answer for the test is 12 inches. Remember this for the test.

22) (Not a question) The preferred maximum distance between the union valve (the thicker pipe connecting other pipes together) pictured here and the top of the access port is 18 inches. Remember this for the test. Construction Regulations 4.1.4 vaguely refers to this but does not mention the term union valve or the 18 inch preferred measurement.

23 and 24) What schedule type of pipe must be used to exit the septic tank, and what is the minimum length this kind of pipe must extend to outside the septic tank before another kind of pipe may be used? (Construction Standards 4.1.4)
Schedule Type of Pipe: _____
Minimum Length Outside Septic Tank Before Another Pipe Type May Be Used: _____

25) What is the range of sizes of drainrock that may be used in your drainfield? (Construction Standards 6.7.3.5)
Minimum Size: _____
Maximum Size: _____

26 and 27) What minimum depth of drainrock must go **below** your drainfield laterals? What about minimum depth of drainrock **above** your laterals? (Construction Standards 6.1.5.3 and 6.1.5.4)
Below: _____
Above: _____

28) A layer of material must go **between** the **drainrock** on top of your laterals and the **backfill/cover** that you will put on top of that. Name one of the acceptable materials that can be used for this in-between layer. **Note: Don't use straw despite the regulation saying it's allowable. Straw will be a wrong answer on the test. The other options are better.** (Construction Standards 6.1.5.4)

29) At least how deep of a layer of cover material (backfill, etc.) must be used to backfill your trenches? As in, going on top of the layer that was asked about in the question above. (Construction Standards 6.1.3.5)
_____ Inches

30) At least how wide a layer of undisturbed soil must be left between your drainfield trenches? (Construction Standards 6.1.3.3)

31 and 32) (Not a question) The centerlines of your trenches should be at least 7 feet apart. 36 inches is standard practice for trench width. Remember these for the test. You will have 7 feet if you use 36 inch wide trenches and 4 feet of undisturbed soil in between your trenches. You must have more undisturbed soil between your trenches if you use a smaller trench width to maintain a 7 centerline separation. (Construction Standards 6.1.3.4)

33) Trenches must be no deeper than _____ inches deep overall. (Construction Standards 6.1.3.5)

END OF DIAGRAM QUESTIONS

34) Cleanouts must be provided at the end of every lateral. The cleanouts must be within ___ inches of finished grade and should be made with either a longsweep elbow, two ____-degree bends or one ____-degree bend.
(Construction Standards 4.2.3.3 G)

35) At least what height of squirt must you get out of the following orifice sizes? (Construction Standards 4.2.3.3 E)
3/16 inch or larger_____
Smaller than 3/16 of an inch_____

36) The 5 final **construction** steps after you have done your squirt test and an inspector has made a final approval of your septic system **are listed here, and are shown in scrambled order.**
Number each step 1 through 5 in the proper order, 1 being done first and 5 being done last.

_____Add a layer of building paper or synthetic fabric over the top of the drainrock.

_____Glue your laterals in the correct orientation.

_____Turn your drainfield laterals over so the orifices face straight down (unless using a shielded system).

_____Backfill your drainfield and the rest of the system with natural soil. You can use topsoil from elsewhere if local soil is too rocky to use as a good backfill.

_____Add at least 2 inches of drainrock on top of your drainfield laterals.