

Exam Knowledge Expectations for Qualified Applicator Certificate & Qualified Applicator License L – Soil Fumigation Category

Use these knowledge expectations (KEs) to help study the suggested material, *Soil Fumigation, Second Edition* (2023). Knowing the information from all of the KEs should prepare you for taking the examination.

Chapter 1. Soil Fumigation

- A. Define a fumigant.
- B. Describe how soil fumigants change from a liquid or solid to a gas.
- C. Describe how the volatility of soil fumigants affects their movement through and distribution in the soil.
- D. Describe the toxicity and hazards associated with soil fumigants.
- E. Describe the chemical characteristics of soil fumigants.
- F. Explain why a fumigant would require a warning agent.

Chapter 2. Regulatory Requirements for Soil Fumigation in California

- A. Describe where to find regulatory requirements that apply to soil fumigation.
- B. Identify the part of a fumigant label that explains what to do before an application and describe the information that will be found there.
- C. Explain how to determine if you are located in a nonattainment area (NAA) and what you must do if you are applying fumigants in an NAA.
- D. Describe the role played by county agricultural commissioners and the need for restricted materials permits.
- E. Explain the process of submitting a Notice of Intent to Apply Restricted Materials.
- F. Describe pesticide use reporting requirements for soil fumigant applications.
- G. Describe the treated area and buffer zone posting requirements for soil fumigation sites.
- H. List the types of difficult-to-evacuate sites that would necessitate restrictions on fumigant applications and describe those restrictions.

Chapter 3. Factors that Influence Soil Fumigant Activity

- A. Identify and describe site characteristics that impact the safe and effective use of fumigants.
- B. Explain the importance of field surface management in relation to product efficacy, public safety, and environmental protection.
- C. Explain how to measure soil temperature and moisture at to determine whether conditions support the use of fumigants.
- D. Describe the relationship between pest density and application rate.

Chapter 4. Hazards Associated with Soil Fumigation

- A. Describe where to find information about pesticide hazards and safety.
- B. Explain how to recognize hazards at the application site that could endanger people.
- C. Name conditions at the application site that may change and influence the hazards associated with fumigant applications.
- D. Explain how to recognize hazards at the application site that could result in injury to people and the environment.
- E. Describe factors that influence offsite movement of fumigants.
- F. Explain how fumigants move offsite in the environment.

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- G. Describe the impact of fumigant applications on volatile organic compound (VOC) emissions, smog and ozone depletion.
- H. Explain the impact of fumigants on nontarget organisms.

Chapter 5. Fumigant Management Plans and Post-Application Summaries

- A. Explain the purpose of a site-specific fumigation management plan.
- B. List the elements of a site-specific fumigation management plan.
- C. Explain the purpose of a post-application summary.
- D. Describe what a post-application summary must contain, who must prepare it, and when it must be completed.

Chapter 6. Personal Safety

- A. Describe how the various fumigants enter the body.
- B. Describe how people get exposed to soil fumigants.
- C. Describe the health effects of exposure to the various fumigants.
- D. Explain when air concentrations of a fumigant would trigger handlers to wear respirators or leave the work area entirely.
- E. Describe where and when air monitoring is necessary.
- F. Describe the certified applicator's responsibilities to handlers participating in soil fumigation activities.
- G. Describe the type of safety information provided by labeling and Safety Data Sheets for the fumigant used.

Chapter 7. Personal Protective Equipment

- A. Identify the parts of a fumigant label that list required personal protective equipment.
- B. Explain the importance of selecting, fit testing, and wearing respiratory devices when applying fumigants.
- C. Describe how to select, fit, care for, and use respirators when handling fumigants.

Chapter 8. Keeping Fumigants on Target

- A. Explain the importance of soil surface management in relation to product efficacy, public safety, and environmental protection.
- B. Describe methods to reduce the environmental impact of fumigant use, including ways to keep fumigants on target.
- C. Explain the ways you can fix poor soil moisture or temperature conditions.
- D. Describe actions that can be taken to correct unsatisfactory soil tilth or plant debris conditions.
- E. Describe the types of tarps used to contain soil fumigants and the importance of properties such as thickness, density, and permeability.
- F. Describe the limits of tarps to contain a fumigant, including the ways that tarps break down in sunlight, whether or not they stretch, and other important characteristics.

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- G. Explain how to anchor a tarp with soil.
- H. Explain how to seal tarps using adhesives.
- I. Explain how to create an effective mechanical soil treatment.
- J. Describe the steps required to create an effective water treatment using sprinkler irrigation.
- K. Explain the general requirements for monitoring after fumigant applications and where to go for current information.
- L. Discuss tarp removal, including how long to wait before removing after cutting.

Chapter 9. Buffer Zones and Posting Requirements

- A. Explain the importance of identifying inhabited structures near the application site.
- B. Define buffer zones and list the factors that can affect them.
- C. Explain how buffer zones help protect people.
- D. Describe how to use a buffer zone table to determine the size of the buffer zone.
- E. Describe the situation in which buffer zone credits can be used to calculate reduced buffer zones for specific fumigant application scenarios.
- F. List the types of activities that are allowed in a buffer zone during the buffer zone period.
- G. Describe procedures to ensure that people will not enter a treated field before the entry-restricted period or restricted-entry interval expires.
- H. Describe notification and posting requirements that help keep people out of treated areas.

Chapter 10. Pests Controlled with Soil Fumigants

- A. Describe the pests that are commonly controlled by soil fumigants.
- B. Describe life cycles of pests that fumigants are used to control, how these pests are damaging to plants, and any life stages resistant to certain fumigants.

Chapter 11. Application Equipment and Methods

- A. List the types of equipment used in soil fumigation applications.
- B. Describe the parts of a chemical injection system and explain how they are used.
- C. List the parts of fumigant application equipment that may need changing, repairing, or adjusting for the fumigant being applied.
- D. Explain how chemical-injection control systems can be used during fumigation.
- E. Describe the purpose and requirements of a backflow prevention system.
- F. List the steps you must take to perform a thorough preapplication inspection of equipment used for soil fumigation.
- G. Describe the types of systems used to carry out ground application of fumigants.
- H. Describe the types of systems used to carry out chemigation applications of fumigants.
- I. Describe how to carry out a tree replant or probe-auger fumigation applications.
- J. Explain why it is important to monitor chemigation equipment during the application to ensure its proper operation.
- K. Explain how to safely clean application equipment.
- L. Explain how to safely dispose of fumigant containers.

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Chapter 12. Calculations and Calibration

- A. List the rates of conversion used to calculate area and application rate, and to properly calibrate application equipment.
- B. Calculate the amount of product required for a specific treatment area.
- C. Calculate row acres for crops grown in beds or strips.
- D. Calculate the broadcast equivalent rate for bedded or strip applications.
- E. Outline the basic techniques for calibrating soil fumigation application equipment.

Chapter 13. Reading the Label

- A. Identify the parts of fumigant labels that have fumigant-specific regulations in them.
- B. Identify the information found in the different parts of fumigant labeling.

Chapter 14. Fumigant Emergencies

- A. Explain how to recognize fumigant emergencies.
- B. Describe procedures for responding to emergencies, including who to call.
- C. Describe who is responsible for preparing for and responding to emergencies.
- D. Describe appropriate first responses for human exposures, including first aid procedures.
- E. List the steps to follow in getting emergency medical treatment for exposure episodes.
- F. Describe procedures for dealing with fumigant leaks and spills.
- G. Describe procedures for dealing with fumigant fires.
- H. Describe how to respond to the misapplication of soil fumigants.