

# HVAC UNLIMITED HEATING, PIPING, AND COOLING (S-2) LICENSE PRACTICE TEST (SAMPLE) STUDY GUIDE



## SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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# Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

# How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

## 1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

## 2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

## 3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

## 4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

## 5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

## 6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

## Questions

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- 1. What primarily determines the rating of an oil burner?**
  - A. Fuel type
  - B. Nozzle size
  - C. Burner design
  - D. Heat output
- 2. Doubling the duct diameter of a round duct increases its capacity by how many times?**
  - A. 3 Times
  - B. 4 Times
  - C. 5 Times
  - D. 6 Times
- 3. True or False? Where field assembly of pressure vessels or boiler is required, a copy of the completed U-1 manufacturer's data report shall be submitted to the code official.**
  - A. True
  - B. False
  - C. Only for new installations
  - D. Only if specified by local authority
- 4. Is it true that a fuel oil burner rated at 1.25 GPH requires 175 square inches of free area for its combustion air openings?**
  - A. True
  - B. False
  - C. Not enough information
  - D. Only if it is a multi-family unit
- 5. What does the term "hunting" refer to in a mechanical context?**
  - A. Excessive speed variations
  - B. Uneven thermal distribution
  - C. Excessive movement in one direction then the other
  - D. Sudden motor shutdown



- 6. What condition would prevent a burner from continuing operation in a gun type oil burner?**
- A. Low voltage
  - B. Flue temperature too high
  - C. Fuel contamination
  - D. Blocked air intake
- 7. True or False: The presence of white smoke coming from a gas-fired burner indicates that the fuel-oil mixture is too lean.**
- A. True
  - B. False
  - C. Not Applicable
  - D. Only during summer months
- 8. For gas heating, what would be considered too lean for combustion?**
- A. 2%
  - B. 4%
  - C. 6%
  - D. 8%
- 9. True or False? The proper fuel draft for a residential oil burner is normally (-.02").**
- A. True
  - B. False
  - C. Uncertain
  - D. Not Applicable
- 10. After a boiler is installed, who is responsible for the start-up?**
- A. Building owner
  - B. Service technician
  - C. Installing contractor
  - D. Manufacturer



## **Answers**

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1. B
2. D
3. A
4. A
5. C
6. B
7. A
8. B
9. A
10. C

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## **Explanations**

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## 1. What primarily determines the rating of an oil burner?

- A. Fuel type
- B. Nozzle size**
- C. Burner design
- D. Heat output

The rating of an oil burner is primarily determined by its nozzle size. The nozzle size plays a critical role in controlling the flow of oil that is atomized and sprayed into the combustion chamber. This, in turn, influences the efficiency and effectiveness of the combustion process. A properly sized nozzle ensures that the right amount of fuel is delivered for optimal burning, which maximizes heat output and minimizes emissions. While factors such as fuel type, burner design, and heat output are important, they do not directly dictate the burner's rating in the way that nozzle size does. The nozzle size must be selected based on the specific requirements of the system and the characteristics of the oil being used, which directly affects combustion quality and efficiency.

## 2. Doubling the duct diameter of a round duct increases its capacity by how many times?

- A. 3 Times
- B. 4 Times
- C. 5 Times
- D. 6 Times**

When the diameter of a round duct is doubled, the cross-sectional area of the duct, which determines its capacity, increases significantly. The area of a circle is calculated using the formula  $A = \pi(d/2)^2$ , where  $d$  is the diameter. When the diameter is doubled, the new diameter becomes  $2d$ . To find the new area, we use the formula: New area =  $\pi((2d)/2)^2 = \pi(d)^2 = 4(\pi(d/2)^2)$ . This means the new area is four times greater than the original area. Since capacity relates directly to cross-sectional area in the case of airflow, doubling the duct diameter increases its capacity by four times. Consequently, the correct answer is that increasing the duct diameter results in a capacity increase of four times, making it clear that option B (4 Times) is the answer.

## 3. True or False? Where field assembly of pressure vessels or boiler is required, a copy of the completed U-1 manufacturer's data report shall be submitted to the code official.

- A. True**
- B. False
- C. Only for new installations
- D. Only if specified by local authority

The statement is true because when pressure vessels or boilers are field-assembled, it is a critical requirement to submit a completed U-1 manufacturer's data report to the code official. This documentation is essential for ensuring compliance with safety and regulatory standards. The U-1 form contains important information regarding the design, materials, and construction of the pressure vessel or boiler, which the code official needs to verify that the installation adheres to applicable codes. In many jurisdictions, this requirement is not optional; it's part of the necessary steps to ensure that the pressure vessels or boilers operate safely and efficiently. It helps maintain the integrity of the heating and cooling systems and protects public safety by ensuring that all components are manufactured and installed according to established standards. This process is part of maintaining accountability and traceability in the heating and cooling industry.

4. Is it true that a fuel oil burner rated at 1.25 GPH requires 175 square inches of free area for its combustion air openings?

A. True

B. False

C. Not enough information

D. Only if it is a multi-family unit

*A fuel oil burner rated at 1.25 gallons per hour (GPH) indeed requires a specific amount of combustion air to operate efficiently and safely. The general guideline is that for every 1,000 BTUs of input to the burner, approximately 0.35 square feet or 50 square inches of free area is needed for combustion air openings. In this case, a 1.25 GPH fuel oil burner has a corresponding BTU input; when this input is calculated, it aligns with a requirement of around 175 square inches of free area for combustion air openings. This amount of free area allows the burner to receive the necessary air for proper combustion, preventing issues like incomplete combustion, which can lead to safety hazards and inefficiencies. Understanding the importance of proper combustion air supply highlights why such specifications are crucial in HVAC installations. This ensures adherence to safety regulations and optimal performance of heating equipment.*

5. What does the term "hunting" refer to in a mechanical context?

A. Excessive speed variations

B. Uneven thermal distribution

C. Excessive movement in one direction then the other

D. Sudden motor shutdown

*The term "hunting" in a mechanical context specifically refers to the phenomenon where a system oscillates excessively, swinging back and forth around a set point. This typically occurs in control systems, including those found in HVAC applications, when the system continuously overcorrects for a deviation from the desired condition. In HVAC systems, hunting can happen when the thermostat or control device doesn't maintain a stable temperature, causing the heating or cooling mechanism to cycle on and off frequently. This excessive movement can lead to increased wear and energy consumption, impacting system efficiency and performance. Thus, the answer pertaining to the excessive movement in one direction and then the other accurately captures what hunting entails within mechanical systems. In contrast, the other options represent different issues: excessive speed variations relate to operational stability; uneven thermal distribution pertains to heat distribution problems rather than oscillation; and sudden motor shutdown indicates a failure rather than a cycling issue. Each of these does not encapsulate the oscillatory behavior identified with hunting.*

**6. What condition would prevent a burner from continuing operation in a gun type oil burner?**

- A. Low voltage
- B. Flue temperature too high**
- C. Fuel contamination
- D. Blocked air intake

*The condition that would prevent a burner from continuing operation in a gun-type oil burner is related to flue temperature being too high. When the flue temperature exceeds safe operational limits, it indicates that the burner may be producing excessive heat, potentially leading to overheating, equipment damage, or even safety hazards such as fire or explosion risks. Oil burners are designed to operate within specific temperature ranges, and if the flue gas temperature rises beyond a certain threshold, the safety controls will often shut down the burner to prevent damage and ensure safe operation. In contrast, other conditions such as low voltage could cause operational issues but may not necessarily result in an immediate shutdown like high flue temperatures would. Similarly, fuel contamination could lead to inefficient burning or other operational problems, but it would not directly cause a burner to stop functioning instantly. A blocked air intake could affect combustion efficiency and lead to operational issues as well, but again, it might not trigger an immediate shutdown compared to the critical safety risk presented by high flue temperatures.*

**7. True or False: The presence of white smoke coming from a gas-fired burner indicates that the fuel-oil mixture is too lean.**

- A. True**
- B. False
- C. Not Applicable
- D. Only during summer months

*The presence of white smoke from a gas-fired burner typically indicates that there is an issue with combustion, specifically that the fuel mixture may not be ideal for efficient burning. In the context of a gas-fired burner, white smoke can suggest that the fuel-air mixture is too lean, which means there is an insufficient amount of fuel relative to the air for combustion. This lean mixture can cause incomplete combustion, leading to the formation of water vapor and unburned hydrocarbons, which manifest as white smoke. In a balanced combustion scenario, the correct ratio of fuel to air allows for complete combustion, producing minimal visible smoke and efficient energy output. When the mixture is too lean, however, it hinders the combustion process, resulting in higher levels of unburned fuel and byproducts, including the white smoke that is noticeable during operation. This understanding is also tied to combustion efficiency and the proper functioning of the burner. Recognizing the implications of visible emissions like white smoke is critical for diagnosing issues with gas-fired heating appliances and ensuring they operate safely and efficiently.*

**8. For gas heating, what would be considered too lean for combustion?**

- A. 2%
- B. 4%**
- C. 6%
- D. 8%

*In gas heating, the combustion process requires a proper mixture of fuel and air to achieve efficient and complete combustion. A fuel-to-air ratio that is too lean means there is insufficient fuel relative to the amount of air available, leading to incomplete combustion. This can cause issues such as a decrease in heating efficiency, higher emissions of nitrogen oxides (NOx), and potentially flame stability problems. A combustion system operating with too lean a mixture typically starts to experience these issues around the 4% mark. When the air-to-fuel ratio exceeds this threshold, the combustion can become inefficient, and the risk of combustion-related problems increases. It's at this point that the combustion process may not produce enough heat effectively or may create dangerous conditions like backfiring or flame lifting due to the instability of the flame. The other percentages listed (2%, 6%, and 8%) either represent a richer mixture, which may still support proper combustion (in the case of 2%), or are too lean, leading to inefficiencies and the aforementioned risks. Thus, 4% serves as an important threshold for determining the lean limit for safe and effective gas combustion.*

**9. True or False? The proper fuel draft for a residential oil burner is normally (-.02").**

- A. True**
- B. False
- C. Uncertain
- D. Not Applicable

*The statement is true because the proper fuel draft for a residential oil burner is typically set around -0.02 inches of water column. This negative draft is essential for ensuring that the burner operates efficiently and safely by maintaining the correct airflow for combustion. Proper draft helps to prevent the buildup of harmful gases in the combustion chamber and ensures that the oil is atomized and combusted effectively. Maintaining the correct draft is crucial not only for efficiency but also for safety reasons, as inadequate draft can lead to poor combustion, excessive smoke, and potential backdrafting of flue gases. Therefore, having a draft of -0.02 inches is a standard operating parameter for residential oil burners, which aligns with industry practices and safety standards in HVAC systems.*



## 10. After a boiler is installed, who is responsible for the start-up?

- A. Building owner
- B. Service technician
- C. Installing contractor**
- D. Manufacturer

*The responsibility for the start-up of a newly installed boiler typically falls on the installing contractor. This is because the installing contractor is the party that has the most direct involvement with the installation process, ensuring the boiler is set up correctly and in accordance with all necessary codes and specifications. They are familiar with the equipment and have the technical knowledge to perform the start-up procedures safely and effectively, including checking for proper operation, making initial adjustments, and addressing any installation-specific issues that may arise. In addition, the installing contractor bears an obligation to ensure that the boiler is functioning accurately before it is turned over to the building owner for regular operations. This step is crucial as it not only verifies that the boiler operates as intended but also educates the building owner or operator about the operation and maintenance of the system. The building owner is responsible for the overall system and its upkeep but relies on the expertise of the contractor for the initial start-up. While a service technician may be involved in maintenance or in the troubleshooting process later, their primary role is not to initiate the start-up after installation if they are not part of the installation team. The manufacturer's role is typically limited to providing the equipment, guidance on operation, and warranty support rather than taking an active part in*

## Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at [hello@examzify.com](mailto:hello@examzify.com).

Or visit your dedicated course page for more study tools and resources:

<https://hvacs2.examzify.com>

We wish you the very best on your exam journey. You've got this!

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