

Lesson 1 - Fuel Oils: Origin, Refining Process, and Burning Characteristics

Objectives:

- Describe the origins of fuel oil.
- Explain the process of simple distillation.
- Name the basic types of fuel oil.
- Describe the applications of fuel oil.

Lesson 2 - Equipment Application Parameters

Objectives:

- List the five types of oil burners.
- Describe the internal and external mixing functions of steam-atomizing burners.
- Explain the function of pressure for the air-atomizing burner.
- Determine the difference between the large mechanical atomizing burner and the smaller mechanical atomizing burner.
- Describe the horizontal rotary cup burner.
- Explain how the pressure-atomizing burner is a form of mechanical atomization.

Lesson 3 - Burners and Accessories

Objectives:

- Explain how oil is ignited.
- Describe atomization and vaporization.
- Name and describe the three methods of atomization.
- List the various accessories for the oil burner.
- Evaluate the performance of an oil burning furnace.

Lesson 4 - Fuel Characteristics, Fuel/Burner Relationship, and Burners

Objectives:

- Explain more characteristics about fuel oils.
- Describe the most common type of oil burner.
- Explain the function of oil burner nozzles.
- List the three types of nozzle spray patterns.
- Describe the effects of viscosity on nozzle performance.

Lesson 5 - Burners: Capacity Selection and Combustion Chamber Installation

Objectives:

- Explain the function of a combustion chamber.
- Name the different types of combustion chambers.
- Determine how to size a combustion chamber.
- Describe the installation process of a combustion chamber.

Lesson 6 - Tanks and Piping: Fuel and Units and Ignition Systems

Objectives:

- Explain the three types of fuel tank installations.
- List the components of a fuel unit.
- Describe the three fuel unit applications.
- List the components of an ignition system.

Lesson 7 - Oil Burners: Controls, Start-up, and Combustion Efficiency Testing

Objectives:

- List the types of controls used in oil heating systems.
- Describe the oil burner operating and safety controls.
- Learn how to test oil burner controls.
- Evaluate combustion efficiency with testing instruments and interpreting the test results.

Lesson 8 - Understanding Oil Burner Controls (Part 1)

Objectives:

- List oil burner controls.
- Describe the action of a primary control.
- Explain the basic operation of a flame detector.
- Describe the operation of the stack-mounted, thermal detector primary control.

Lesson 9 - Understanding Oil Burner Controls (Part 2)

Objectives:

- Describe the cad cell oil primary control.
- Evaluate the performance of a cad cell.
- Explain the difference between the cad cell and the stack thermal flame detector.
- List the four other types of flame detectors.

Lesson 10 - Troubleshooting Primary Controls

Objectives:

- Describe fundamental field wiring for primary controls.
- Explain the troubleshooting sequence for when the burner will not start.
- Troubleshoot a constant ignition system and an intermittent ignition system.
- List the various types of difficulties encountered with controls for an oil heating system.
- Explain the difference between difficulties of overheating and underheating a home.

Lesson 11 - Troubleshooting Components (Part 1)

Objectives:

- Describe the development of natural draft.
- Explain draft regulation.
- List the various types of draft difficulties.
- Describe ignition transformers and their problems.

Lesson 12 - Troubleshooting Components (Part 2)

Objectives:

- Troubleshoot a fuel unit.
- Select a fuel unit for fuel unit replacement.
- Solve noise problems in fuel units or fuel lines.
- Describe the operation of a delayed-action oil solenoid valve.

Lesson 13 - Troubleshooting Controlled Components

Objectives:

- Care for and service a nozzle.
- Describe the various types of air patterns for oil burners.
- Explain the important factors regarding spray patterns for nozzles.
- Select nozzles for maximum efficiency.

Lesson 14 - Industrial Flame Safeguard Controls

Objectives:

- Describe the operation and application of various types of flame safety controls.
- Explain infrared scanners.
- Describe ultraviolet detectors.
- List various conditions and causes of flame safety controls operation.
- Name some organizations' code requirements of flame safety control processes.

Lesson 15 - Troubleshooting Systems

Objectives:

- Troubleshoot miscellaneous complaints.
- Describe service procedures for troubleshooting oil burners.