

# Comfort Heating: Introduction

Copyright © 2011 by



Columbus, Ohio

The information in this course was written as a general guide. The HARDI Independent Study Institute has neither liability nor can the school be responsible to any person or entity for any misunderstanding, misuse or misapplication that would cause loss or damage of any kind, including loss of rights, materials, or personal injury, or alleged to be caused directly or indirectly by the information contained in this course.

# Learning Objectives

This course is designed to provide an overview of the principles, products and systems used in modern small system heating for individuals having little or no knowledge about comfort heating.

Upon successful completion of all assignments and tests in this course, the student-employee should be able to:

1. Describe what is required to keep people comfortable in winter.
2. List the building characteristics and weather conditions that affect building heat loss.
3. Identify components in ordinary forced air heating systems and understand the function they perform.
4. Use and understand the meaning of selected technical terms encountered in the industry.

You will demonstrate accomplishing these objectives by successfully completing two written examinations during the training period.

# Course Content

## 1. The Comfort Challenge

Control of Air—The Key	Lesson 1, Page 2
Keeping Warm	Lesson 1, Page 3
Room Air Motion	Lesson 1, Page 4
Controlling the System	Lesson 1, Page 8
Design and Safety	Lesson 1, Page 9

## 2. What is Heat?

How Heat Moves	Lesson 2, Page 3
How Heat is Measured	Lesson 2, Page 5

## 3. What it Takes to Be Comfortable

Body Temperature	Lesson 3, Page 2
Humidity	Lesson 3, Page 4
Humidity vs. Temperature	Lesson 3, Page 4
Other Factors	Lesson 3, Page 5

## 4. Heating Problems & Construction

Source of Loss	Lesson 4, Page 2
Reducing Losses	Lesson 4, Page 2
Moisture and Construction	Lesson 4, Page 4
Slab Floors	Lesson 4, Page 7
Crawl Spaces	Lesson 4, Page 8
Forced Ventilation	Lesson 4, Page 10
System Interface	Lesson 4, Page 11
Countering Heat Loss	Lesson 4, Page 14

## 5. Estimating Heat Loss

Calculating Heat Loss	Lesson 5, Page 4
Floor Heat Loss	Lesson 5, Page 7
Infiltration	Lesson 5, Page 9
Ventilation	Lesson 5, Page 9
Total Heat Loss	Lesson 5, Page 9

## 6. Forced Air Heating Units

Basic Furnaces Classes	Lesson 6, Page 2
Testing Furnaces	Lesson 6, Page 2
Furnace Ratings	Lesson 6, Page 3
Burners	Lesson 6, Page 5

## 7. Duct Systems & Registries

Duct Terms	Lesson 7, Page 3
Types of Systems	Lesson 7, Page 4
Registers, Diffusers & Grilles	Lesson 7, Page 6
Location	Lesson 7, Page 7
Return Grille	Lesson 7, Page 8
Resistance to Air Flow	Lesson 7, Page 9
Duct Heat Loss	Lesson 7, Page 12

## 8. Humidity

What is Humidity?	Lesson 8, Page 2
Measuring Relative Humidity	Lesson 8, Page 3
Types of Humidifiers	Lesson 8, Page 7
Controls	Lesson 8, page 9
Winter Dehumidification	Lesson 8, Page 10

## 9. Air Quality & Filters

Filtering Devices	Lesson 9, Page 3
How Filters Work	Lesson 9, Page 4
Static Cling	Lesson 9, Page 4
Controlling Odors	Lesson 9, Page 5
Filter Performance	Lesson 9, Page 6
Filter Life	Lesson 9, Page 8

## 10. Automatic Heat

Thermostatic Bimetals	Lesson 10, Page 2
Solid State Devices	Lesson 10, Page 2
Thermostat Controls Heating Unit	Lesson 10, Page 3
Zone Thermometers	Lesson 10, Page 3
The Transformer	Lesson 10, Page 4
Gas Valve	Lesson 10, Page 5
Safe Ignition	Lesson 10, Page 5
Oil Burner Controls	Lesson 10, Page 6
Safety Shutdown	Lesson 10, Page 7
Heat Pump	Lesson 10, Page 8
Electric Furnace	Lesson 10, Page 8
Limit Controls	Lesson 10, Page 9
Wiring Diagrams	Lesson 10, Page 12

## 11. What are Codes?

History	Lesson 11, Page 3
Who's the Boss?	Lesson 11, Page 5
Code Groups	Lesson 11, Page 6

## 12. Doing a Quality Installation

Building Styles	Lesson 12, Page 2
Be a Code Expert	Lesson 12, Page 5
System Adjustments	Lesson 12, Page 11
Continuous Circulation	Lesson 12, Page 13
System CFM	Lesson 12, Page 14

## 13. Energy Choices

Fuel Considerations	Lesson 13, Page 2
Natural Gas	Lesson 13, Page 3
Other Gases	Lesson 13, Page 4
Fuel Oil	Lesson 13, Page 5
Electric Heat	Lesson 13, Page 6
Solar Energy	Lesson 13, Page 7
Heat Energy in Fuels	Lesson 13, Page 8
Cost of Fuel	Lesson 13, Page 9

## 14. Other Systems

The Heat Pump	Lesson 14, Page 2
Hydronic Heating	Lesson 14, Page 3
Forced Hot Water	Lesson 14, Page 4
Boilers	Lesson 14, Page 4
Steam Systems	Lesson 14, Page 6
Radiators	Lesson 14, Page 6
Baseboard	Lesson 14, Page 6
Convectors	Lesson 14, Page 7
Panel Heating	Lesson 14, Page 7

## 15. Troubleshooting Heating Companies

Regular Maintenance	Lesson 15, Page 2
Adjustments	Lesson 15, Page 4
Customer Complaints and Traditional Causes	Lesson 15, Page 6
Poor Installation	Lesson 15, Page 9
Poor Design	Lesson 15, Page 9

## 16. Appendixes

<b>Self-Check Answer Keys</b>	<b>Appendix A</b>
Glossary	Appendix B