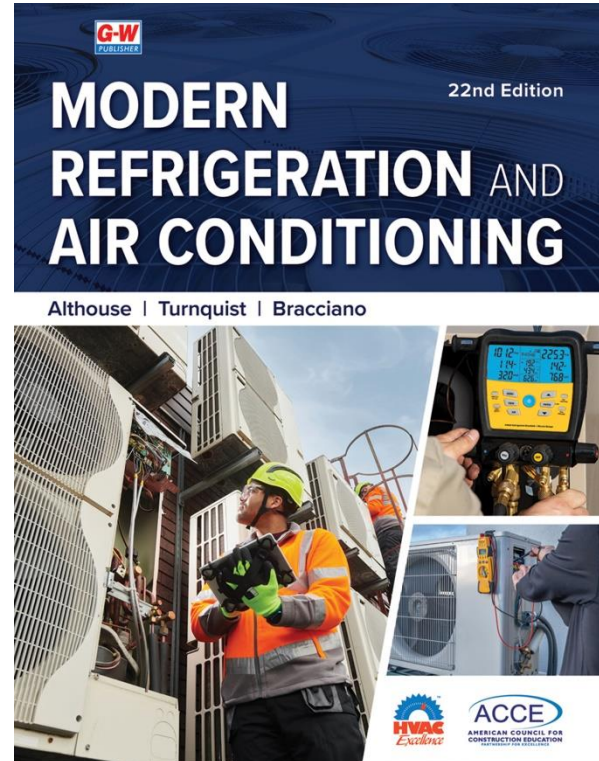


Correlation of
Modern Refrigeration and Air Conditioning, Althouse, Turnquist, Bracciano
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to
AHRI Curriculum Guide XII. Heat Pump Systems

Goodheart-Willcox is pleased to partner with the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and the American Council for Construction Education (ACCE) by correlating *Modern Refrigeration and Air Conditioning* to the AHRI Curriculum Guide. The following chart correlates *Modern Refrigeration and Air Conditioning* to a section of the Curriculum Guide developed by AHRI used for ACCE (formerly PAHRA) accreditation.

The chart lists the Curriculum Guide’s knowledge and task competency objectives in the left column and the corresponding chapter numbers from *Modern Refrigeration and Air Conditioning* in the right column.

For more information on the American Council for Construction Education (ACCE) and related accreditation, please visit:
www.acce-hq.org



XII.A. Basic Principles and Components	
Knowledge	Textbook Chapter(s)
1. Review the history of heat pumps.	Chapters 36, 37
2. Explain the basic theory of the air source heat pump system.	Chapters 36, 37
3. Explain the basic theory of the water source heat pump system.	Chapters 36, 37
4. Explain the basic theory of the geothermal source heat pump system.	Chapters 36, 37
5. Identify and explain the function of the electrical and mechanical components of the heat pump systems.	Chapters 13, 14, 15, 16, 17, 23, 33, 36, 37

**Correlation of *Modern Refrigeration and Air Conditioning* to AHRI Curriculum Guide:
XII. Heat Pump Systems—page 2**

XII.A. Basic Principles and Components (continued)	
Knowledge	Textbook Chapter(s)
6. Explain terms typically used for heat pumps:	
a. Seasonal Energy Efficiency Ratio (SEER)	Chapters 36, 37
b. Coefficient of Performance (COP)	Chapters 36, 37
c. Heating Seasonal Performance Factor (HSPF)	Chapters 36, 37
d. Balance Points	Chapters 36, 37
e. Outdoor Design Temperature (ODT)	Chapters 36, 37
f. Optimizer	Chapters 36, 37
7. Analyze and explain the refrigerant cycle in both cooling and heating—identifying the pressure and state of the refrigerant at any point in the refrigerant circuit.	Chapters 8, 10, 22, 23, 36, 37
8. Explain the different types of defrost methods.	Chapters 36, 37, 44, 45
9. Describe the operation of the time clock in a defrost control.	Chapters 36, 37, 44, 45
10. Identify which three components of a heat pump system are controlled directly during a defrost cycle.	Chapters 36, 37, 44, 45
11. Describe a heat pump thermostat function.	Chapters 36, 37
Tasks	Textbook Chapter(s)
1. Check reversing valve for proper temperatures.	Chapters 4, 11, 12, 36, 37
2. Calculate both economic and thermal balance points.	Chapters 36, 37
3. Calculate temperature settings for multiple outdoor thermostats.	Chapters 36, 37
4. Check refrigerant charge using charging chart.	Chapters 4, 10, 11, 12, 36, 37
5. Check sequence of operation of an air-to-air split system heat pump for cooling, heating, and defrost modes.	Chapters 3, 4, 11, 12, 14, 17, 19, 36, 37
XII.B. Applications	
Knowledge	Textbook Chapter(s)
1. Identify and describe different types of heat pump systems:	
a. air-cooled	Chapters 36, 37
b. water-source (open loop, closed loop, air-to-water, water-to-water, and geothermal)	Chapters 36, 37

**Correlation of *Modern Refrigeration and Air Conditioning* to AHRI Curriculum Guide:
XII. Heat Pump Systems—page 3**

XII.B. Applications (continued)	
Knowledge	Textbook Chapter(s)
2. Analyze and compare the operation and performance of the different types of heat pump systems:	
a. Explain the integration and operation of the air-to-air heat pump with electric resistance heat.	Chapters 36, 37
b. Explain the integration and operation of the water-to-air heat pump with electric resistance heat.	Chapters 36, 37
c. Explain the integration and operation of the air-to-air heat pump with a fossil fuel unit.	Chapters 36, 37
d. Explain applications for open vs. closed loop geothermal pump systems.	Chapters 36, 37
Tasks	Textbook Chapter(s)
1. Mechanically and electrically connect and check out:	
a. Air-to-air heat pump	Chapters 4, 5, 10, 11, 12, 14, 16, 17, 19, 36, 37
b. Water-to-water heat pump	Chapters 4, 5, 10, 11, 12, 14, 16, 17, 19, 36, 37