Correlation of

***Modern Refrigeration and Air Conditioning,* by Althouse, Turnquist, Bracciano**
(Goodheart-Willcox Publisher ©2021)
to
AHRI Curriculum Guide: XIII. Heating Systems

The following chart correlates the *Modern Refrigeration and Air Conditioning* textbook (©2021) to a section of the Curriculum Guide developed by Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and used for PAHRA accreditation.

The chart lists the Curriculum Guide's knowledge and task competency objectives and the corresponding chapter numbers from *Modern Refrigeration and Air Conditioning*.

For more information on the Partnership for Air-Conditioning, Heating, Refrigeration Accreditation (PAHRA) and related accreditation, please visit: www.pahrahvacr.org

XIII.A. Forced Warm Air Systems	
Tasks	**Textbook Chapter(s)**
1. Check the operation of the ignition system.	Chapters 38, 41, 42
2. Derate or change over a gas burner.	Chapters 38, 41, 42
3. Adjust burner flame for proper fuel/air ratio.	Chapters 38, 41, 42
4. Check for proper temperature rise through the furnace.	Chapters 38, 41, 42
5. Test all safety controls.	Chapters 38, 41, 42
6. Remove, install, and adjust blower motor and/or belt.	Chapters 29, 30, 38, 41, 42
7. Clean pilot assembly.	Chapters 38, 41, 42
8. Oil motor(s) and bearings.	Chapters 18, 29, 30, 38, 41
9. Check and adjust heat anticipator of thermostat.	Chapters 18, 36
10. Use orifice sizing charts.	
11. Test induced draft pressure switches.	Chapters 7, 10, 11, 16, 18, 38, 41
12. Check all safety controls.	Chapters 3, 7, 10, 11, 18, 38, 41
13. Check operation of sequence.	Chapters 3, 7, 10, 11, 38, 41

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XIII.B. Hydronic Systems	
Knowledge	**Textbook Chapter(s)**
1. Identify types of hydronic piping systems.	Chapter 39
2. Identify types of boilers.	Chapter 39
Tasks	**Textbook Chapter(s)**
1. Check circulator for alignment and lubrication.	Chapters 18, 39
2. Set aquastat.	Chapters 7, 10, 36, 39
3. Check water pressure regulating valve (PRV).	Chapter 39
4. Check the zone valve operation.	Chapters 7, 39
5. Remove air from system.	Chapter 39
6. Check backflow preventer.	Chapter 39
7. Check compression/expansion tank.	Chapter 39
8. Check water temperature rise across the boiler.	Chapters 7, 39
9. Check and adjust water level in pressure tanks.	Chapters 7, 39
10. Check automatic air vent operation.	Chapters 7, 39
11. Wire multizone/multipump hydronic systems.	
XIII.C. Testing and Balancing Equipment	
Tasks	**Textbook Chapter(s)**
1. Perform pressure checks on air distribution system.	Chapters 7, 27, 29, 30, 38
2. Perform pressure checks on fuel system.	Chapters 7, 27, 38, 41, 42
3. Perform efficiency test and adjust to recommended rate:	
a. check draft	Chapters 7, 10, 27, 38, 41, 42
b. check smoke (if applicable)	Chapters 41, 42
c. check stack temp	Chapters 7, 10, 41, 42
d. check CO_2	Chapters 7, 10, 41, 42
e. check O_2	Chapters 7, 10, 41, 42
f. check CO	Chapters 7, 10, 41, 42
4. Perform balance method for an air distribution system.	Chapters 7, 27, 29, 30
5. Perform balance method for a hydronic system.	Chapters 7, 39

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XIII.D. Humidification	
Knowledge	**Textbook Chapter(s)**
1. Explain the importance of humidification.	Chapters 27, 35
2. Describe different types of humidifiers.	Chapter 35
3. Explain factors affecting humidity in business and residence.	Chapter 35
Tasks	**Textbook Chapter(s)**
1. Select proper humidification equipment.	Chapters 27, 35, 37, 38
2. Check operation of humidification equipment.	Chapters 7, 10, 18, 27, 35, 37
3. Perform maintenance on humidification equipment.	Chapters 7, 10, 18, 27, 35, 37
4. Determine relative humidity using a psychrometer.	Chapters 7, 10, 18, 27, 35, 37
5. Determine dew point using a psychrometer.	Chapters 7, 10, 18, 27, 35, 37
XIII.E. Unitary Combination Heating and Cooling	
Knowledge	**Textbook Chapter(s)**
1. Describe the sequence of operation of a heating system.	Chapters 38, 40, 41, 42, 43
Task	**Textbook Chapter(s)**
1. Use and read various tools and instruments needed for checking and testing combination air-conditioning and heating systems.	Chapters 7, 10, 11, 17, 27, 30
XIII.F. Oil Furnaces	
Knowledge	**Textbook Chapter(s)**
1. Explain and check the sequence of operation of oil stack switches.	Chapter 42
2. Explain and check the sequence of operation of electronic primary controls.	Chapter 42
3. Understand how to replace oil filters.	Chapter 42
4. Understand how to purge water from oil storage tanks.	Chapter 42
5. Understand how to oil motors.	Chapters 15, 18, 29, 30, 38, 42
Tasks	**Textbook Chapter(s)**
1. Replace oil nozzle and adjust electrodes.	Chapter 42
2. Perform combustion test and adjust to optimum efficiency.	Chapter 42
3. Perform safety shutdown check.	Chapter 42
4. Replace oil nozzles with proper size replacements.	Chapter 42
5. Inspect and adjust electrodes, replacing when necessary.	Chapter 42
6. Test and adjust oil pumps and couplers.	Chapter 42

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XIII.G. Electric Furnaces	
Knowledge	**Textbook Chapter(s)**
1. Understand the use of sequencers in electric furnaces.	Chapter 43
2. Understand the effects of airflow on temperature rise.	Chapters 7, 27, 29, 38, 43
Tasks	**Textbook Chapter(s)**
1. Inspect heating elements and insulators.	Chapter 43
2. Test thermal fuses.	Chapters 16, 18, 43
3. Inspect all electrical connections.	Chapters 13, 15, 16, 17, 18, 43
4. Check for proper temperature.	Chapters 7, 27, 29, 38, 43
5. Oil motors.	Chapters 15, 18, 29, 30, 38, 43
6. Test sequence of operation of electric furnaces.	Chapters 7, 12, 13, 16, 18, 27, 29, 30, 43