

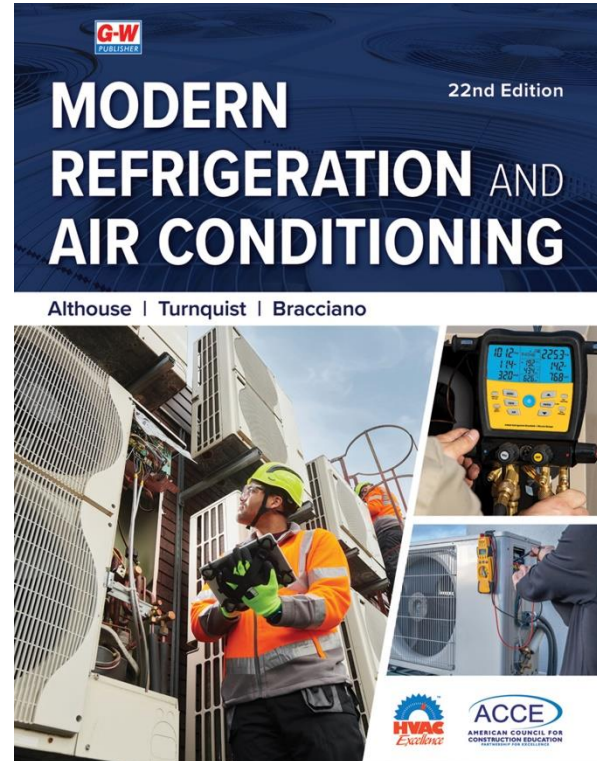


Correlation of
Modern Refrigeration and Air Conditioning, Althouse, Turnquist, Bracciano
(Goodheart-Willcox Publisher ©2025)
 to
AHRI Curriculum Guide IV. Tools and Equipment

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



IV.A. Hand Tools and Accessories	
Knowledge	Textbook Chapter(s)
1. Identify basic tools:	
a. adjustable wrenches	Chapter 4
b. Allen (hex) wrenches	Chapter 4
c. crimpers	Chapters 4, 5
d. diagonal cutting pliers (dikes)	Chapter 4
e. flare nut wrenches	Chapter 4
f. general-use pliers	Chapter 4
g. hack saw	Chapter 4

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IV.A. Hand Tools and Accessories (continued)	
Knowledge	Textbook Chapter(s)
h. hand saw	Chapter 4
i. lineman pliers (sidecutters)	Chapter 4
j. nutdrivers	Chapter 4
k. open & box end wrenches	Chapter 4
l. pipe wrenches	Chapter 4
m. pulley & gear pullers	Chapter 18
n. punches	Chapter 4
o. scratch awl	Chapter 4
p. sheet metal snips	Chapter 4, 30
q. socket wrenches	Chapter 4
r. torque wrenches	Chapter 4
s. various hammers	Chapter 4
t. various screwdrivers	Chapter 4
u. wire strippers	Chapter 14
v. tape measure	Chapter 4
w. solder gun	Chapters 4, 19
x. Schrader valve	Chapters 11, 12
2. Identify power tools:	
a. general-purpose drills	Chapter 4
b. hammer drill	Chapter 4
c. power screwdriver	Chapter 4
d. reciprocating saws	Chapter 4
e. screwgun	Chapter 4
3. Identify fasteners:	
a. bolts	Chapter 4
b. conduit, pipe, and cable clamps	Chapters 4, 5, 14, 22, 23, 25, 33, 34, 47
c. masonry anchors	Chapter 4
d. nails	Chapter 4
e. screws	Chapter 4
f. various electrical connectors	Chapter 4, 14, 19
g. pop rivets	Chapter 30

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IV.A. Hand Tools and Accessories (continued)	
Knowledge	Textbook Chapter(s)
4. Identify pipe and tubing tools:	
a. benders	Chapters 4, 5
b. flaring tools	Chapter 5
c. pipe cutters, reamers, and threaders	Chapter 5
d. pipe vises	Chapter 5
e. swaging tools	Chapter 5
f. tubing cutters and reamers	Chapter 5
5. Describe lubrication methods using different types of circuits:	
a. grease guns	Chapter 19
b. oilers	Chapters 19, 25
c. sprays	Chapters 3, 19, 25
Tasks	Textbook Chapter(s)
1. Show the proper use of a pipe cutter.	Chapter 5
2. Show the proper use of a threader.	Chapter 5
3. Demonstrate how to make a flared tubing joint.	Chapter 5
IV.B. Electrical Testing Devices/Meters	
Knowledge	Textbook Chapter(s)
1. Define <i>amps, volts, ohms, and watts</i> .	Chapters 13, 14
2. Measure AC current with a clamp-on meter.	Chapter 18
Tasks	Textbook Chapter(s)
1. Measure voltage with digital and analog voltmeters.	Chapter 18
2. Measure AC current with a clamp-on ammeter.	Chapter 18
3. Measure resistance with an ohmmeter.	Chapter 18
4. Check winding insulation with a megohmmeter.	Chapter 18
5. Check voltage with a voltage tester.	Chapter 18
6. Use a continuity tester to determine whether an open circuit or dead short exists.	Chapter 18
7. Use a capacitance meter to measure capacitance of run and start capacitors.	Chapter 19
8. Calculate capacitance.	Chapter 19

IV.B. Electrical Testing Devices/Meters (continued)	
Tasks	Textbook Chapter(s)
9. Wire and measure resistance of different types of circuits:	
a. series	Chapters 13, 18
b. parallel	Chapters 13, 18
c. unequal	Chapters 13, 18
d. series-parallel	Chapters 13, 18
IV.C. Refrigeration: Servicing and Testing Equipment	
Tasks	Textbook Chapter(s)
1. Measure pressures with the refrigeration gauge manifold.	Chapter 11
2. Evacuate systems with a two-stage vacuum pump.	Chapter 12
3. Measure vacuums with a thermistor vacuum gauge.	Chapter 11
4. Measure temperatures with electronic thermometers.	Chapter 11
5. Measure temperatures with bimetal, thermocouple, or glass stem thermometers.	Chapter 4
6. Charge a system with a charging cylinder.	Chapter 12
7. Charge a system with an electronic charging scale.	Chapter 12
8. Check for leaks with an electronic leak detector and halide torch.	Chapter 12
9. Use nitrogen with trace of R-22 for leak detection.	Chapters 12, 47
10. Compare readings to manufacturers' specifications.	Chapters 12, 48, 49, 50
11. Determine refrigerant amount and type.	Chapters 11, 12
12. Charge a system to manufacturers' specifications.	Chapters 12, 47
IV.D. Heating: Servicing and Testing Equipment	
Tasks	Textbook Chapter(s)
1. Measure chimney draft with a gauge:	
a. Measure draft over fire	Chapter 34
b. Measure draft at the chimney breaching	Chapter 34

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IV.D. Heating: Servicing and Testing Equipment (continued)	
Tasks	Textbook Chapter(s)
2. Perform an efficiency test on an oil-gas burner:	
a. smoke test	Chapter 34
b. CO ₂ test	Chapter 34
c. O ₂ test	Chapter 34
d. check draft	Chapter 34
e. check stack temperature	Chapter 34
3. Determine effectiveness of an oil pump using:	
a. vacuum gauge	Chapter 34
b. pressure gauge	Chapter 34
4. Determine relative humidity using a sling psychrometer:	
a. Find the relative humidity and dew point using a psychrometric chart	Chapter 28
5. Measure gas pressure with the following equipment:	
a. U-tube manometer	Chapters 4, 33
b. pressure gauge	Chapters 4, 33
6. Calculate proper size of chimney for both 80 and 90+ furnaces.	Chapter 33
7. Determine what to do with an “orphaned” water heater.	Chapter 38
8. Check wall thermostat and anticipator:	
a. cooling system (fan on-automatic)	Chapters 17, 19, 22, 23, 25
b. heating system (fan on-automatic)	Chapters 17, 19, 33, 34, 35, 36, 37, 38
9. Check electronic pilot system.	Chapters 17, 19, 33
10. Check and adjust blower system.	Chapters 4, 17, 19, 30, 31, 33, 34
11. Check and adjust fan control.	Chapters 17, 19, 30, 31, 33
12. Check limit and safety controls.	Chapters 4, 17, 19, 33, 34, 35, 36, 38

IV.E. Airflow: Measuring and Testing Equipment	
Tasks	Textbook Chapter(s)
1. Determine air velocity within a duct via:	
a. pitot tube	Chapters 4, 28, 30, 31
b. inclined manometer	Chapters 4, 28, 30, 31
c. electronic manometer	Chapters 4, 28, 30, 31
d. U-tube manometer	Chapters 4, 28, 30, 31
2. Determine air velocity at grilles and diffusers via:	
a. deflecting vane anemometer	Chapters 4, 28, 30, 31
b. velometer	Chapters 4, 28, 30, 31
c. hot wire anemometer	Chapters 4, 28, 30, 31
d. pitot tube	Chapters 4, 28, 30, 31
e. rotating vane anemometer	Chapters 4, 28, 30, 31
3. Measure pressure drop with a magnehelic gauge.	Chapters 4, 28, 30, 31
4. Determine cubic feet per minute (CFM).	Chapters 4, 30, 31, 32
5. Use manufacturers' airflow data sheet.	Chapter 30
6. Solve problems using friction loss chart.	Chapters 30, 31