



Correlation of
Modern Refrigeration and Air Conditioning, by Althouse, Turnquist, Bracciano
(Goodheart-Willcox Publisher ©2021)
to
AHRI Curriculum Guide: XXII. Refrigerants and Lubricants

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



XXII.A. Refrigerants	
Knowledge	Textbook Chapter(s)
1. Explain the different classes of refrigerants:	
a. CFC refrigerants	Chapter 9
b. HCFC refrigerants	Chapter 9
c. HFC refrigerants	Chapter 9
d. HC refrigerants	Chapter 9
e. other refrigerants	Chapter 9
f. azeotropic mixtures (ASHRAE 500 series)	Chapter 9
g. zeotropic blends (ASHRAE 400 series)	Chapter 9

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XXII.A. Refrigerants (continued)	
Knowledge	Textbook Chapter(s)
2. Explain physical and chemical properties:	
a. flammability and toxicity	Chapter 9
b. materials compatibility	Chapter 9
c. miscibility and oil return	Chapter 9
d. pressure and temperature data	Chapter 9
e. refrigerant temperature glide	Chapter 9
f. environmental properties (ODP, GWP, and TEWI)	Chapter 9
g. bubble point	Chapters 9, 31
h. dew point	Chapters 9, 31
3. Define <i>pure refrigerants</i> and <i>azeotropic mixtures</i> .	Chapter 9
4. Define <i>zeotropic mixtures</i> .	Chapter 9
5. Define <i>zeotropic blends</i> .	Chapter 9
6. Identify the color and classification of refrigerants by Pantone Matching System (PMS) color number.	Chapter 9
7. Explain fractionalization of blends.	Chapter 9
Tasks	Textbook Chapter(s)
1. Look up saturation pressure and temperature:	
a. single element refrigerant	Chapter 9, Appendix
b. azeotropic	Chapter 9, Appendix
c. zeotropic	Chapter 9, Appendix
d. blends	Chapter 9, Appendix
2. Identify when saturation pressure and temperature do not match the refrigerant.	Chapters 7, 9, 10, 11, Appendix
3. Calculate superheat and subcooling.	Chapters 7, 9, 10, 11, Appendix
4. Calculate superheat and subcooling glide.	Chapters 7, 9, 10, 11, Appendix

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XXII.B. Lubricants	
Knowledge	Textbook Chapter(s)
1. Explain the function of lubricants in systems.	Chapters 9, 19, 20
2. Explain the different types and applications of lubricants:	
a. alkylbenzenes (AB)	Chapter 9, Appendix
b. mineral oils	Chapter 9, Appendix
c. polyolesters (POE)	Chapter 9, Appendix
d. polyglycols (PAG)	Chapter 9, Appendix
3. Explain properties of lubricants:	
a. materials compatibility	Chapter 9, Appendix
b. miscibility and oil return	Chapter 9, Appendix
c. pour point and flash point	Chapter 9, Appendix
d. viscosity	Chapters 9, 19, Appendix
e. water absorption	Chapter 9, Appendix
f. rust and oxidation inhibitors	Chapter 9, Appendix
4. Describe proper oil disposal.	
Tasks	Textbook Chapter(s)
1. Draw oil sample from system.	Chapters 9, 26, 55
2. Demonstrate proper handling of POEs.	Chapter 55
3. Use acid test kit for mineral oil and AB.	Chapter 26, 55
4. Demonstrate proper use of a refractometer or oil sample test.	