

## ARIZONA REGISTRAR OF CONTRACTORS

### R-39/C-79 (CR-79) AIR CONDITIONING AND REFRIGERATION, INCLUDING SOLAR (RESIDENTIAL/COMMERCIAL)

#### SCOPE OF WORK

**R-39 Air Conditioning and Refrigeration, Including Solar Scope** - Installation and repair of comfort air conditioning systems, including refrigeration, evaporative cooling, ventilating and heating with or without solar equipment. Installation and repair of machinery, units, accessories, refrigerator rooms, and insulated refrigerated spaces, and controls in refrigerators. If necessary, a new circuit may be added to the existing service panel or sub-panel. Excluded is the installation of a new service panel or sub-panel.

**C-79 Air Conditioning and Refrigeration, Including Solar Scope** - Installation, alteration, and repair of refrigeration and evaporative cooling systems.

Installation, alteration, and repair of heating systems of "wet", "dry" or radiant type. "Wet" systems include steam or hot water boilers and coils, or baseboard convectors, and are limited to 30 PSIG operating pressure of 220° F for hot water and 15 PSIG operating pressure for steam. Dry systems include gas fired furnaces and space heaters.

Installation, alteration, and repair of ventilation systems includes duct work, air filtering devices, water treatment devices, pneumatic or electrical controls, and control piping. Thermal and acoustical insulation of refrigerant pipes and ductwork, vibration isolation materials and devices, liquid fuel piping and tanks, water and gas piping from service connection to the equipment it serves. Testing and balancing of refrigerant, cooling, heating circuits, and air handling systems.

If necessary, a new circuit may be added to the existing service panel or subpanel. Excluded is the installation of a new service panel or subpanel.

Examination	# of Questions	Minimum Passing Score	Time Allowed
R-39 C-79	80	70%	210 Minutes
R-39 C-79 Solar	30	70%	75 Minutes

#### CONTENT OUTLINE FOR R-39 AND C-79

Subject Area	# of Items
Refrigeration	12
Air Conditioning	12
Warm Air Heating	12
Controls and Motors	8
Boilers	4
Ventilation	4
Evaporative Coolers	4
Fuel Piping Systems	5
Water Piping Systems	5
Steam, Hot, Chilled and Condensing Water	5
Testing, Balancing, and Inspection	5
Sizing and Estimating	4



#### REFERENCE LIST FOR R-39 AND C-79

To find reference materials, you may use the link provided or search for the material online via a search engine such as Google. You may also go to PSI's online store at [www.psionlinestore.com](http://www.psionlinestore.com).

The reference material listed below was used to prepare the questions for this examination. The examination may also contain questions based on trade knowledge or general industry practices. **Except for Code books**, you can base your answers on later editions of references as they become available. For Code questions, the examinations will be based **only** on the edition of the Code book that is listed.

Candidates may use a silent, nonprinting, non-programmable calculator in the examination center.

*The following reference material is allowed in the examination center:*

*Code of Federal Regulations - 29 CFR Part 1926 (OSHA)*, with latest available amendments, U.S. Government Printing Office, (866) 512-1800 or <https://www.osha.gov/laws-regs/regulations/standardnumber/1926>

OR

*Code of Federal Regulations - 29 CFR Part 1926 Selections by PSI*, with latest available amendments, 3210 E Tropicana, Las Vegas, NV 89121, (800) 733-9267, [www.psionlinestore.com](http://www.psionlinestore.com)

*International Fuel Gas Code*, 2009, International Code Council, (800) 786-4452, [www.iccsafe.org](http://www.iccsafe.org) Starting 1/1/2019 the 2018 code will be used

*International Mechanical Code*, 2009, International Code Council, (800) 786-4452, [www.iccsafe.org](http://www.iccsafe.org) Starting 1/1/2019 the 2018 code will be used

*International Plumbing Code*, 2009, International Code Council, (800) 786-4452, [www.iccsafe.org](http://www.iccsafe.org) Starting 1/1/2019 the 2018 code will be used

*The following reference material is not allowed in the examination center:*

*Modern Refrigeration and Air Conditioning*, Althouse, Turnquist, Bracciano, 19<sup>th</sup> or 20<sup>th</sup> edition, Goodheart-Willcox, [www.g-w.com](http://www.g-w.com)

*Low Pressure Boilers*, Frederick M. Steingress, Daryl R. Walker, 2009, 3rd Edition, American Technical Publishers, Inc., (800) 323-3471, [www.atplearning.com](http://www.atplearning.com)

*ACCA Ductulator*, Air Conditioning Contractors of America, <http://www.acca.org>

## CONTENT OUTLINE FOR R-39 AND C-79 SOLAR

Subject Area	# of Items
Collection Loops	5
Components	4
Installation	5
Maintenance	2
Mounting	4
Principles	5
Solar Systems Piping	5

## REFERENCE LIST FOR R-39 AND C-79 SOLAR

*The following reference material is not allowed in the examination center:*

*Solar Water and Pool Heating Design and Installation Manual, 2006, Florida Solar Energy Center, 1679 Clearlake Road, Cocoa, FL 32922-5703, (321) 638-1015, [www.nabcep.org/wp-content/uploads/2013/08/FSEC\\_Solar\\_Water\\_and\\_Pool\\_Heating\\_Manual.pdf](http://www.nabcep.org/wp-content/uploads/2013/08/FSEC_Solar_Water_and_Pool_Heating_Manual.pdf)*

Candidates are responsible for bringing their own references to the examination center. Reference materials may be highlighted, underlined, annotated and/or indexed prior to the examination session. However, references may not be written in during the examination session. Any candidate caught writing, highlighting, underlining and/or indexing in the references during the examination will be reported to the Arizona Registrar of Contractors. Furthermore, candidates are not permitted to bring in any additional papers (loose or attached) with their approved references. References may be tabbed/indexed with permanent tabs only. (permanent tabs are defined as tabs that would tear the page if removed). Temporary tabs, (defined as Post-It notes, or other tabs that may be removed without tearing the page) are not allowed and must be removed from the reference before the exam will begin. If you are downloading from the Internet, you may bring this reference into the testing center with you as long as it is bound. You can have it spiral bound or you may hole-punch it and put it in a binder.

