

ARIZONA REGISTRAR OF CONTRACTORS

C-77 (CR-77) PLUMBING, INCLUDING SOLAR (COMMERCIAL)

SCOPE OF WORK

Installation, alteration and repair of all plumbing, including solar, when performed solely within property lines and not on public easements or right-of-ways except as hereinafter provided.

Installation, alteration and repair of all piping, fixtures and appliances related to water supply, including pressure vessels and tanks (excluding municipal or related water supply systems); venting and sanitary drainage systems for all fluid, semi-fluid and organic wastes; septic tanks and leaching lines; roof leaders; lawn sprinkler systems; water conditioning equipment; piping and equipment for swimming pools.

Also included are piping, fixtures, appliances and pressure vessels for manufactured and natural gases, compressed air and vacuum systems, petroleum, fuel oil, non-potable liquids, hot water heating and hot water supply systems operating at pressures not exceeding 30 psig or temperatures not exceeding 220° F; steam heating and steam supply systems not exceeding 15 psig operating pressure; gas- or oil-fired space heaters and furnaces excluding duct work. Piping for water cooling systems excluding the refrigerant piping and equipment. Testing and balancing of hydronics systems.

Sewer, gas, water lines and connections from structure to the nearest point of public supply or disposal may cross public or private easements or be installed within private easements. Pipe installed across public property may not be increased in size or make any other connection between the point of exit from private property to point of connection at public supply or disposal. These lines shall not be installed parallel to main lines in public easements or right-of-ways.

Examination	# of Questions	Minimum Passing Score	Time Allowed
C-77	100	70%	240 Minutes
C-77 Solar	30	70%	75 Minutes

C-77

CONTENT OUTLINE

Subject Area	# of Items
Drainage Waste and Vents	15
Indirect Waste	4
Water Supply Systems	12
Backflow Prevention	5
Roof Drains and Storm Drainage Systems	5
Plumbing Fixtures (including water heaters and accessibility)	6
General Knowledge and General Regulations	8
Specialty Plumbing, Interceptors, and Traps	5
Isometric Analysis	5
Fuel Gas	10
Septic and Sewer	10
Hydronics	5
Fire Sprinklers	5
Excavation	5

REFERENCE LIST

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.

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 <http://www.access.gpo.gov/nara/cfr/cfr-table-search.html>

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 (See order form at the end of the Candidate Information Bulletin.)

International Fuel Gas Code, 2018, International Code Council, (800) 786-4452, www.iccsafe.org

International Mechanical Code, 2018, International Code Council, (800) 786-4452, www.iccsafe.org

International Plumbing Code, 2018, International Code Council, (800) 786-4452, www.iccsafe.org

NFPA 13 - Installation of Sprinkler Systems, 2016 Edition, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, www.nfpa.org

NFPA 13D - Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, 2007 Edition, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, www.nfpa.org

NFPA 13R - Sprinkler Systems for Residential Occupancies up to and Including Four Stories in Height, 2007 Edition, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, www.nfpa.org

On-site Wastewater Treatment Facility Provisions in Unified Water Quality Permit Rule, Arizona Administrative Code Title 18, Chapter 9, 2006, Arizona Department of Environmental Quality, 1110 West Washington Street, Phoenix, AZ 85007, www.azdeq.gov



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

Mathematics for Plumbers and Pipefitters, 7th Edition, 2008, solutions.cengage.com

IPT's Pipe Trades Handbook, 1991, Robert A. Lee, IPT Publishing & Training, Ltd.

Boiler Operator's Guide, 4th edition, 1997, Kohan, Anthony, www.bnibooks.com

Arizona 811 - Arizona Blue Stake Brochure, 2010, Arizona Blue Stake, (800) 782-5348, www.azbluestake.com

Modern Hydronic Heating for Residential and Light Commercial Buildings, Second Edition, 2004.

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.

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C-77 SOLAR

CONTENT OUTLINE

Subject Area	# of Items
Pool Systems	1
Estimating and Sizing	2
Collectors	3
Controls	3
Open and Closed Loop Systems	5
Pipes and Materials	5
System Designs	5
Pumps and Storage Systems	6

REFERENCE LIST

The following reference material is allowed in the examination center:

International Plumbing Code, 2018 Edition, International Code Council, www.iccsafe.org

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

