



ROOFTOP SOLAR HEATING INSTALLATION SPECIALTY CONTRACTORS TRADE KNOWLEDGE EXAMINATION CONTENT INFORMATION

May 2024

The Rooftop Solar Heating Installation Specialty Contractor portion of the specialty license examination is composed of 65 questions. It will be administered in one session via computer.

You should be prepared to respond to examination questions on any of the content areas listed. Questions asked and content areas tested on previous examinations should not be assumed to be the only possible questions to be asked or content areas to be tested on this examination.

The percentage of questions shown for each content area may vary by as much as plus or minus three (3) percent. Please refer to the Candidate Information Brochure and the Reference List for additional information.

Content Area 1 **5%** **Foundations of Solar Heating Technology**

- knowledge of the historical context and evolution of solar heating
- knowledge of basic solar thermal principles including the conversion of solar energy into heat, solar radiation, and thermal storage
- knowledge of solar heating applications, domestic hot water, and solar pool heating

Content Area 2 **9%** **Components of Solar Heating Systems**

- knowledge of solar collectors including flat-plate collectors and evacuated tube collectors and their construction, operation, and suitability for different applications.
- knowledge of solar storage solutions including tank types, insulation, integration with auxiliary heating sources.
- knowledge of auxiliary components including pumps, controllers, heat exchangers, and valves.

Content Area 3 **15.5%** **Solar Thermal System Design**

- knowledge of sizing principles for domestic hot water and pool heating applications.
- knowledge of site assessments including evaluating solar potential, shading analysis, and roof conditions.
- knowledge of system configuration including closed-loop vs. open-loop systems, active vs. passive systems, and direct vs. indirect circulation systems.

Content Area 4 **18.5%** **Installation Practices for Solar Heating Systems**

- knowledge of pre-installation considerations including safety planning, tool selection, and site preparation.
- knowledge of mounting solar collectors including techniques for roof penetration, sealing, and collector alignment.
- knowledge of piping and insulation including routing, insulation materials, and methods to minimize heat loss.
- knowledge of system integration including connecting to existing plumbing and heating systems, and pool pump integration without altering pool equipment, including pool pumps.

Content Area 5 **9%** **Electrical Basics for Solar Installers**

- understanding the electrical components of solar thermal systems, including wiring for controllers and sensors.
- knowledge of safety standards for electrical work in solar installations.
- knowledge of ability to diagnose and resolve common electrical issues in solar heating systems.

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Content Area 6 **12%** **Hydraulics and Plumbing for Solar Thermal Systems**

- knowledge of hydraulic principles relevant to solar heating, including fluid dynamics and pressure losses.
- knowledge of detailed plumbing techniques for durability and leak prevention.
- knowledge of winterization of solar thermal systems and antifreeze considerations in closed-loop systems.

Content Area 7 **8%** **Compliance with Codes and Standards**

- in-depth knowledge of building codes, plumbing codes, and electrical codes affecting solar thermal installations.
- knowledge of the permitting process for solar thermal systems, including documentation and inspections.
- knowledge of industry standards for solar heating performance and safety.

Content Area 8 **12%** **Operational Maintenance and System Troubleshooting**

- knowledge of routine maintenance tasks for solar thermal systems to ensure optimal performance.
- knowledge of troubleshooting flowcharts for common system issues including collector, storage, and circulation failures.
- knowledge of repair strategies including when to repair in-field versus replacing components.

Content Area 9 **6%** **Safety and Best Practices in Solar Installations**

- knowledge of advanced safety practices for working at heights, including fall protection systems.
- knowledge of handling of solar thermal components to prevent injury and equipment damage.

Content Area 10 **5%** **Solar Project Management and Professional Responsibilities**

- knowledge of estimating material costs, labor, and project timelines.
- knowledge of effective client communication including explaining system benefits, operation, and maintenance requirements.
- knowledge of record-keeping requirements
- knowledge of warranty considerations for solar heating installations.