



STUDY GUIDE  
For the  
REGISTERED ROOF OBSERVER (RRO<sup>®</sup>) EXAM

Prepared By  
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# RRO Study Guide

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## **STUDY GUIDE RRO EXAMINATION RCI, Inc.**

### **INTRODUCTION**

One early goal of RCI, Inc. was to develop a recognized and highly regarded registration program for Roof Quality Assurance Observers. The registration program was authorized by the RCI Board of Directors in 1989 and implemented in 1992. The primary beneficiaries of this program are the public, the roofing industry, and those who become registered.

RCI offers its RRO Program to all applicants, members and non-members. Registration is a two-part program based on an application process along with satisfactory performance on a comprehensive Internet-based examination.

This study guide outlines subjects that are addressed in the examination; however, it is not intended to be an inclusive listing of every topic. This document is strictly a guide.

The latest RRO exam revision was completed in October 2012 in compliance with the Standard for the Accreditation of Certification Programs as published by the National Commission for Certifying Agencies (NCCA). A committee of subject matter experts followed a rigorous psychometric process in its development.

The examination is not tailored to any one particular area of roof observation, or to the design and construction practices unique to any geographic area. It deals primarily with roof observations in general. It may include all phases of roof observations (methodology and construction), both steep and low-slope roofing, and all systems (shingle, tile, slate, single-ply, modified bitumen, built-up, wood, metal and spray applied systems).

In order to receive a passing score on the examination, the examinee must be thoroughly familiar with the basic methodology of Q.A.O. and have a broad knowledge of: ethics, roof systems, field testing, reporting, safe work practices, communication, and codes and standards. Preparation for the exam is essential and a list of the references most frequently used in its development is provided.

The exam is offered online by Castle Worldwide, an Internet-based testing company. It consists of 150 multiple choice questions and is up to four hours in duration.

Consult <http://www.castleworldwide.com/mainsite/ibtsites> for a conveniently located testing site near you.

## References\*

A sample of documents/references that were used to develop the RRO Exam is as follows:

<i>Title</i>	<i>Author</i>	<i>Publication Date</i>
1. Manual of Low-Slope Roof Systems – Fourth Edition Construction and Repair // ASTM D7186-05	C.W. Griffin & R.L. Fricklas/McGraw Hill	2006
2. NRCA Roofing Manual: Architectural Metal Flashings	NRCA	2014
3. NRCA Roofing Manual: Membrane Roof Systems	NRCA	2015
4. NRCA Roofing Manual: Metal Panel & SPF Roof Systems	NRCA	2016
5. NRCA Steep-Slope Roofing Systems	NRCA	2013
6. RCI Code of Ethics	RCI	2012
7. RCI Manual of Practice	RCI	2010
8. RCI Roofing Technology & Science I	RCI	2012
9. RCI Roofing Technology & Science II	RCI	2012
10. RCI Rooftop Quality Assurance Manual	RCI	2006
11. Spri.org/publications.com – Standards and Technical Reports	SPRI	accessed in 2012
12. Standard Practice for Quality Assurance Observation of Roof Construction and Repair (ASTM D-7186)	ASTM International	2005

\*Although many references were involved, those listed above are representative of the most frequently used in the development of the exam.

As part of the exam revision process, the committee of subject matter experts systematically compiled a list of objectives that relate to the responsibilities, knowledge, and skills associated with acceptable performance within the quality assurance observer profession. This list provided the organizational framework for the exam and is attached below.

<b>Sections</b>	<b>Section/Objective Title</b>	<b>Percentage of questions from section on exam</b>
<b>Section 1</b>	<b>Observation</b>	<b>47.30%</b>
Objective 1.1	Review contract documents prior to a site visit, including drawings, specifications, addendums, submittals, manufacturer's data, approved change orders, and applicable building codes in order to understand the requirements of the project.	
Objective 1.2	Assemble necessary tools, equipment and PPE in order to perform RRO tasks on a project site.	
Objective 1.3	Collect project information by observing site conditions, attending periodic progress site meetings, and talking to site personnel to document project status.	
Objective 1.4	Observe work activities, materials, equipment and installation procedures to verify conformance with contract documents and industry standard installation procedures.	
Objective 1.5	Observe and record test procedure and measurements using appropriate tools (e.g. thermometers, tape measure, probing devices, safety PPE) in order to verify compliance with the contract documents.	
<b>Section 2</b>	<b>Reporting</b>	<b>32.67%</b>
Objective 2.1	Provide an unbiased accurate (true reflection of the conditions observed) project report to include, but not limited to, project personnel, work observations, field test results, time on site, unforeseen conditions, and non-conformance issues, deviations and resolutions, in order to inform the client about project status and mitigate liability and risk.	
Objective 2.2	Produce all written and verbal communications in a professional, legible, articulate, and expeditious manner to include photographic documentation as required.	
Objective 2.3	Record project site conditions (e.g., wind, temperature, humidity, and precipitation) in order to verify compliance with the contract documents.	
Objective 2.4	Record Observer's reimbursables (e.g., mileage, expenses) using company-required documents in order to justify expenses.	
Objective 2.5	Estimate percent completion of the roofing scope using basic area calculations in order to assist the client with project status.	
<b>Section 3</b>	<b>RRO Roles and Responsibilities</b>	<b>20.03%</b>
Objective 3.1	Review company QAO procedures and project-specific obligations to understand and familiarize yourself with the scope of work, safety procedures, and other items.	
Objective 3.2	Refrain from directing Contractors in the performance of their contractual duties in order to avoid liability.	
Objective 3.3	Identify, follow, and note the project specific roles to establish a clear communication and record path.	
Objective 3.4	Adhere to RCI Code of Ethics and Professional Standards to preserve the reputation/public image of self, firm and RCI in order to avoid conflicts of interest, criminal issues and lawsuits.	

## RRO Exam Sample Questions

1. The RRO is observing the Contractor install a 1/2" (13 mm) wood fiber cover board over the base layer of insulation; however the Construction Documents state that a 3/4" (19 mm) perlite cover board is to be installed. What should the RRO do?
  - A. Assume that the 1/2" (13 mm) wood fiber was approved.
  - B. Assume that the Contractor is not installing the correct material.
  - C. Contact the Owner immediately.
  - D. Notify the Contractor, record the deviation and contact the Designer Authority.
  
2. How would a change to the Specifications be made prior to the submittal of bids?
  - A. Change Order
  - B. Change Directive
  - C. Purchase Order
  - D. Addendum
  
3. Which of the following seaming procedures is appropriate for TPO membranes?
  - A. Hot-air welding
  - B. Solvent-welding
  - C. Liquid-applied adhesive
  - D. Mastic-applied
  
4. The RRO observes that the temperature of the roofing asphalt at the point of application is too low. How should the RRO determine what the proper asphalt temperature at the point of application is?
  - A. Review the flash point of the asphalt.
  - B. Review the finish blowing temperature of the asphalt.
  - C. Review the EVT of the asphalt.
  - D. Review the temperature gauge at the asphalt kettle.

5. Which of the following could be a cause of blistering on an SBS roof?
  - A. Voids in the interply moppings
  - B. Excessive amounts of asphalt
  - C. Incorrect type of asphalt
  - D. Improper installation of the underlayment
  
6. Which of the following surface textures are acceptable for SPF?
  - A. Smooth, orange peel, coarse orange peel, or popcorn
  - B. Smooth, orange peel, coarse orange peel, or treebark
  - C. Smooth, orange peel, popcorn or verge of popcorn
  - D. Smooth, orange peel, coarse orange peel, or verge of popcorn
  
7. Per OSHA, what is the proper distance from the wall that the base of a ladder should be placed?
  - A. One-fifth of the working height
  - B. One-fourth of the working height
  - C. One-third of the working height
  - D. One-half of the working height
  
8. The RRO would be involved in which of the following tasks:
  - A. Direct construction means and methods
  - B. Document and quantify unforeseen conditions
  - C. Accept material substitutions
  - D. Help enforce project schedule
  
9. The RRO is reviewing the installation of a roof system over a steel deck. The RRO observes that the deck has been modified in order to accommodate the installation of a new CCTV system with an opening between 8 in. to 13 in. (200 mm to 325 mm) in diameter. The RRO is concerned about the integrity of the deck around this opening. What action should the RRO take?
  - A. Tell the Roofing Contractor to remove the CCTV system and repair the deck opening.
  - B. Inform the Roofing Contractor that plate reinforcement is required over the top of the deck due to the size of the opening.
  - C. Inform the Roofing Contractor that plate reinforcement is required on the underside of the deck due to the size of the opening.
  - D. Document the condition and contact the Designer of Record for direction.

10. A roof is 85 squares in area. The Contractor has  $\frac{1}{8}$ <sup>th</sup> of the total roof left to complete. What area has been completed so far?
- A. 10 squares
  - B. 70 squares
  - C. 1,063 sq. ft. (99 sq. m.)
  - D. 7,438 sq. ft. (691 sq. m.)
11. When installing asphalt shingle on a plywood deck, what is the MINIMUM depth the nails should penetrate through the plywood deck?
- A.  $\frac{1}{8}$ " (3 mm)
  - B.  $\frac{1}{4}$ " (6 mm)
  - C.  $\frac{1}{2}$ " (13 mm)
  - D.  $\frac{3}{4}$ " (19 mm)
12. According to the *NRCA Roofing Manual*, how often should a termination bar be fastened on single-ply base flashings?
- A. 6" (150 mm)
  - B. 8" (200 mm)
  - C. 12" (300 mm)
  - D. 18" (450 mm)
13. What is the MAXIMUM roof slope recommended for the application of a coal-tar roof?
- A. Less than  $\frac{1}{4}$  inch per foot
  - B. Less than  $\frac{1}{2}$  inch per foot
  - C. Less than  $\frac{3}{4}$  inch per foot
  - D. Less than 1 inch per foot
14. Proper documentation of Contractor manpower, crew size, weather conditions, and weather related work stoppages can be used to determine which of the following?
- A. If the Contractor's crews are being efficient with the installation of the material
  - B. If the Contractor should be paid for the work completed
  - C. If the RRO should direct the contractor to add manpower
  - D. If contract time extensions are granted, or if financial penalties are imposed



15. ASTM D312 - *Standard Specification for Asphalt Used in Roofing* lists four types of roofing asphalt based on resistance to flow. The preferred type of asphalt for a built-up membrane being installed on a roof having a slope greater than 1:12 is:
- A. Type I Asphalt.
  - B. Type II Asphalt.
  - C. Type III Asphalt.
  - D. Type IV Asphalt.
16. What information should be contained in the RRO's daily report?
- A. Work activities, installation procedures, and the RRO's opinion of Contractor performance
  - B. Work activities, materials being used, and installation procedures
  - C. Work activities, equipment being used, and number of apprentices on the job
  - D. Work activities, Contractor break times, and weather conditions
17. In what Division in the CSI Specification Format would the RRO expect to find criteria for thermal roof insulation?
- A. Division 6
  - B. Division 7
  - C. Division 8
  - D. Division 9
18. NRCA recommends that the board size of polyisocyanurate roof insulation in adhered application not exceed:
- A. 2' x 4' (600 x 1200 mm)
  - B. 3' x 4' (900 x 1200 mm)
  - C. 4' x 4' (1200 x 1200 mm)
  - D. 4' x 8' (1200 x 2400 mm)
19. The RRO is observing the installation of a slate roof system with a pitch of 10:12. What is the recommended head lap for 12" x 24" (300 mm x 600 mm) slate?
- A. 2" (50 mm) head lap
  - B. 3" (75 mm) head lap
  - C. 4" (100 mm) head lap
  - D. 6" (150 mm) head lap

20. When on site, the RRO observes the Contractor is not properly storing material on a daily basis. What is the appropriate action the RRO should take?
- A. Record observations in the field report and report the condition to the Contractor and Design Authority.
  - B. Inform the Contractor of the discrepancy and give the Contractor the opportunity to correct the problem.
  - C. Inform the Owner that the Contractor is not complying with the Specifications.
  - D. Assist the Contractor with correcting the discrepancy.

## Answers to Sample Questions

Note your answers. Review the appropriate document(s) in those areas to better understand the rationale behind the indicated correct answer.

The following courses provided by RCI are highly recommended for those pursuing the RRO designation: Roofing Technology and Science I and II, Rooftop Quality Assurance and Building Envelope Quality Assurance (available late-2016).

1. D
2. D
3. A
4. C
5. A
6. D
7. B
8. B
9. D
10. D
11. A
12. C
13. A
14. D
15. D
16. B
17. B
18. C
19. B
20. A