CERTA

Recertification Teaching Notes



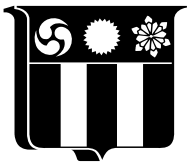





Torch-applied Roof System Safety

CERTA Program

04/2023



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04/2023

CERTA Program

Torch-applied Roof System Safety

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Program Introduction

SECTION INTRODUCTION

OUTCOME Upon completion of this introductory unit, participants will be able to:

1. Describe the purposes of the CERTA program

TIMING This unit is divided into three parts:

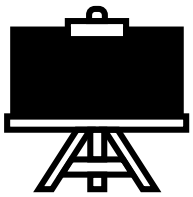
A. Welcome (5 minutes)

B. Icebreaker (10 minutes)

C. CERTA Trivia: Hit or Myth? (15 minutes)

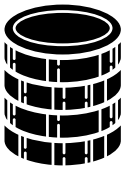
Total Unit Time: 30 minutes

MATERIALS

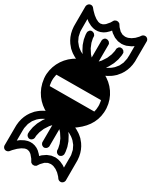


Flip chart and markers

Student manuals



Loose coins



Small prize or candy for icebreaker winner (optional)

FACILITATION GUIDE

Sec.	Notes and Materials	Directions and Discussion
A	Welcome (15 minutes) ***Before starting the session, write the workshop outcomes on flip-chart paper and post them in the front of the classroom.***	
		**Welcome** participants to the class, and emphasize the importance of their active participation during the training. **Introduce** yourself, and provide your credentials and related industry experience. **Provide** the following administrative details: • The workshop outcomes listed on the flip chart. • Site safety information, locations of restrooms and refreshments. • Program start and stop times. • Your break schedule and classroom policies. • Request all class members turn off their pagers and cell phones or put them on vibrate mode. • Explain to all participants that to become recertified, they must pass a final written exam and a torching performance test during the hands-on portion of the program. **Explain** that for a worthwhile and enjoyable learning experience to occur, students should: • Ask questions • Share their experiences when relevant • Ask for examples when necessary • Arrange an oral exam for a later time if they think they may have difficulties completing a final written exam
B	Icebreaker (10 minutes)	
		Have participants introduce themselves and share one thing with the group that most people don't know about them.
C	CERTA Trivia: Hit or Myth Review Exercise (15 minutes)	
		Instruct students to turn to **page 4 (Spanish page 4)** of the student manual to find the exercise titled CERTA Trivia: Hit or Myth? **Explain** students have five minutes to review the five statements and answer the five questions. **Tell** students to stop writing after five minutes. **Call** on individual students to read one statement at a time, asking them to share their answers. Challenge students to further explain their responses. **Progress** through the entire list until all five have been reviewed.

Example Answers to CERTA Trivia: Hit or Myth?

Statement 1: When I follow the safety practices for installing torch-applied roof systems, the quality of my workmanship suffers.

☐ True √ False

Why or why not?

High-quality workmanship can be attained when following the safety practices. If you are not used to installing torch-applied roof systems using these procedures, you may need to practice these skills to achieve quality workmanship, thus requiring more time at first to do installations. These skills also require more forethought during installation to avoid direct application of an open flame toward hazardous areas.

Statement 2: When I install torch-applied roof systems, I am more aware of potential fire hazards than I was before completing my CERTA training.

√ True ☐ False

Why or why not?

CERTA training provides an increased awareness of common hazardous areas and how fires start when using a roofing torch. And the training provides methods for using a roofing torch that help reduce the risk of fires.

Statement 3: I don't have to worry about fire hazards when using a roofing torch to dry an area of a roof.

☐ True √ False

Why or why not?

Any time an open flame is directed toward a roof surface, a hazard is created. An open flame can react to blowing wind or negative building pressures and be sucked into openings and vents or other hazardous areas without being noticed, thus starting a fire.

Statement 4: Using the torch-and-flop method at flashing details and for installing field plies at edges and walls is an effective way to reduce risks of fire.

√ True ☐ False

Why or why not?

The best way to reduce the risk of starting a fire is to never direct a flame at edges, walls or flashing details.

Statement 5: I am a better roofing worker because of what I have learned in the new CERTA program.

√ True ☐ False

Why or why not?

Participants have an increased awareness of and can better recognize the hazardous areas where fires start when using a roofing torch. But more important, they learn what to do to avoid starting a fire when they recognize a hazard.

Section 1 Safety Practices for Torch-applied Roof System Application

SECTION INTRODUCTION

OUTCOMES Upon completing this section, participants will be able to:

1. Explain the purpose of each published safety practice
2. Identify safety practices that best apply to given situations

TIMING This section is divided into two parts:

A. Review of published safety practices (15 minutes)

B. Safety practices review exercise (15 minutes)

Total Unit Time: 30 minutes

MATERIALS  Student manuals

FACILITATION GUIDE

A Review of Published Safety Practices (15 minutes)

Tell students to turn to **page 5 (Spanish page 5)** of their student manuals.

Direct one student to read the first safety practice.

Ask the student to explain why the safety practice is important and how it helps reduce the risk of fire.

Continue having students read the remaining safety practices, one per student, until all safety practices have been read and discussed.

Expected student explanations and comments for each safety practice:

1 . CHECKLIST

1.1 Complete a daily checklist (job hazard analysis) for all torching jobs.

2. PRE-JOB PLANNING

2.1. The roofing contractor responsible for a project that involves the use of roofing torches must develop a written fire prevention plan identifying hazards and controls that the contractor plans to implement to reduce the risk of fire. Part of the plan must include:

2.1.1 The job foreman or supervisor shall review daily with the building owner conditions that could present hazards during torching and address them.

2.1.2 The contractor must identify hazards and establish controls to reduce or eliminate possible fire traps and hidden hazards; see Section 3, Application, paragraphs 3.1 – 3.2.4.2.2.

2.2 Have a minimum of two 4A60BC fire extinguishers available within 10 feet of each lit torch being used to heat membrane.

2.2.1 Train all personnel on the roof on how to use a fire extinguisher.

2.3 Inspect penetrations, such as exhaust vents, inside and outside. Lint, grease or other substances, if present, shall be cleaned prior to torching work.

2.4 Have a cell phone available or other means of immediately communicating with 911 or another emergency responder.

2.5 Comply with state and local fire and building ordinances where applicable.

3. APPLICATION

3.1 Field-of-the-roof installation

3.1.1 Over concrete, steel or gypsum roof decks:

3.1.1.1 The CERTA program recommends compliance with the recommendations contained in the most current edition of The NRCA Roofing Manual: Membrane Roof Systems. (See CERTA Authorized Trainers Guide Appendix for specific citations.)

3.1.2 Over plywood, wood plank, oriented strand board or wood fiberboard roof decks or substrates:

3.1.2.1 For compliance with CERTA Torching Principles, in no case may torch-applied membranes be applied by torching directly to the above-listed decks, including where a gypsum cover board has been installed.

3.1.2.2 In conjunction with the recommendation in the most current edition of The NRCA Roofing Manual: Membrane Roof Systems, the CERTA program does not recommend torching of modified bitumen products over plywood, wood plank, oriented strand board or wood fiber roof decks. Roofing contractors are advised to urge designers to consider alternative application specifications when polymer-modified bitumen roof membranes are specified over the above-listed decks.

3.1.2.3 On a project where a building owner or designer is unwilling to accept, or cannot change to, an alternative application specification, the CERTA program suggests the following to minimize the fire risk prior to application of polymer-modified bitumen field membranes:

3.1.2.3.1 Installation of a minimum 2-inch-thick stone wool insulation or min. ½ Portland cement or min. ½ inch gypsum deck board (e.g., DensDeck or Securock) fastened to the deck, followed by

A Review of Published Safety Practices (continued)

3.1.2.3.2 Installation of an air-impermeable backer layer consisting of one of the following two options:

3.1.2.3.2.1 Option 1: Installation of a minimum of one layer of self-adhering, smooth-surfaced polymer-modified bitumen sheet.

3.1.2.3.2.2 Option 2: Installation of a layer of fiberglass ply sheet, fiberglass base sheet or polymer-modified bitumen base sheet mechanically fastened to the substrate and

3.1.2.3.2.1.1 Installation of a minimum of one additional layer of a fiberglass ply sheet adhered to the underlying layer in a solid mopping of hot asphalt, OR

3.1.2.3.2.1.2 Installation of a polymer-modified bitumen base sheet adhered to the underlying layer in a solid mopping of hot asphalt.

3.1.2.4 Roofing contractors should note that manufacturers' instructions or project specifications that do not meet the recommendations in 3.1.2.2 or 3.1.2.3 over decks specified in 3.1.2. are not addressed by of compliant with CERTA Torching Principles for fire-risk minimization.

3.2 Flashing installation: The CERTA program recommends polymer-modified bitumen flashings shall be installed using one of the following flashing system application methods:

3.2.1 Torch-and-flop indirect torching

3.2.2 Cold-applied adhesives

3.2.3 Mop-applied with hot bitumen

3.2.4 Direct torching using a single-burner, low-output (105k Btu or less) "detail" torch as follows:

3.2.4.1 Over plywood, wood plank, oriented strand board or wood fiberboard substrates or deck, an air-impermeable backer layer with sealed laps installed over the flashing and deck substrate shall be incorporated into the flashing assembly prior to the application of the torch-applied polymer-modified bitumen sheet finish surface. Acceptable adhered backer layers include ONE of the following:

3.2.4.1.1 Installation of:

3.2.4.1.1.1 A layer of fiberglass ply sheet, fiberglass base sheet or polymer-modified bitumen base sheet mechanically fastened to the substrate AND

3.2.4.1.2.1 An additional layer of a minimum of one-layer fiberglass ply sheet or polymer-modified bitumen base sheet adhered to the underlying layer in a solid mopping of hot asphalt.

3.2.4.1.2 Installation of a minimum of one layer of self-adhering, smooth-surfaced polymer-modified bitumen sheet.

3.2.4.2 Over concrete, masonry, steel, concrete block or gypsum substrates, an adhered backer layer with sealed laps installed over the flashing substrate shall be made part of the membrane flashing assembly prior to the application of the torch-applied polymer-modified bitumen sheet finish surface. Acceptable adhered backer plies include one of the following:

3.2.4.2.1 Installation of a minimum of one-layer of fiberglass ply sheet, fiberglass base sheet or polymer-modified bitumen base sheet adhered in a solid mopping of hot asphalt.

3.2.4.2.2 Installation of a minimum of one layer of self-adhering, smooth-surfaced polymer-modified bitumen sheet.

Note: If the membrane flashing substrate cannot be specifically identified as concrete, masonry, steel, concrete block or gypsum, direct torching with a detail torch is permitted if 3.2.4.1 is used.

A	Review of Published Safety Practices (continued)

4. TORCHING SAFETY

4.1 Only CERTA certified torch applicators shall operate torches when an open flame will contact any part of a roof.

4.1.1 Using an open flame for roof drying or de-icing shall be performed by CERTA certified torch applicators.

4.1.2 The use of an open flame torch solely to heat bitumen equipment valves (i.e., hot luggers, felt layers or kettles) or bitumen pipe assemblies is acceptable and may be performed by a noncertified applicator as long as an open flame does not contact the roof, flashings or any part of the roof assembly.

4.2 Never torch directly to any combustible material. Identify and protect materials that may burn when in contact with an open flame, such as, plywood, oriented strand board (OSB), wood, plank wood fiberboard and other combustible building components.

4.3 Never torch directly to an area where you cannot see the path of the open flame (including—but not limited to—flashings, corners, curbs, voids, expansion joints and small roof penetrations). Use alternative application methods, such as torch-and-flop indirect torching, cold-applied adhesives or mop-applied with hot bitumen, in these areas.

4.4 A lit torch shall only be placed on the roof surface, with the flame positioned in a safety direction, using a functional torch stand.

4.5 A lit torch shall never be left unattended.

5. FIRE WATCH REQUIREMENTS

5.1 There must be an ongoing job site fire watch conducted by a properly trained and dedicated individual. This includes:

5.1.1 During the entirety of lunch and other breaks when torching activity has been suspended

5.1.2 After all roofing torches have been shut down at the end of the workday.

5.1.2.1 A minimum tow-hour fire watch, as described in the CERTA training program, shall be conducted and must include checking the roof's underside (whenever possible), as well as the roof surface, curbs and other flashings for smoldering or elevated temperatures.

B	Safety Practices Review Exercise (15 minutes)	
		**Tell** students to turn to **page 7 (Spanish page 7)** of their student manuals. **Direct** one student to read the first statement and then choose the safety practice listed that best matches the statement. **Tell** all students to write the correct answer in the line next to each statement. **Continue** having students read the remaining statements, one per student, until all statements have been read and answered. **Discuss** each student's response to the extent time allows. The correct answers are provided on the next page.

Safety Practices Review Answer Key

A. **3.1.2.3** I am installing a new roof using a roofing torch. The deck is made of plywood. I know I need to install a thermal barrier first.

B. **4.3** I need to torch a small piece of flashing under a door threshold, but I cannot see what is under the door or siding. I should not use a torch. Instead, I will install the flashing using the proper cold-applied adhesive.

C. **2.1** Before we started working today, our foreman talked with the building owner. It is a good thing he did because the owner's warehouse guys stored some flammable solvent on a shelf against a wall right under where we were planning to torch today. That could have been a disaster!

D. **2.3** We pulled an old exhaust fan off a curb so the new flashing material would fit under its flange. When we pulled off the fan, we found three old bird nests under the hood. They could have caught fire had we not found them.

E. **2.5** Our superintendent stopped by the torching job this morning and posted a city burn permit on the door leading out to the roof.

F. **2.2.1** A small fire started smoldering under an eave where a gutter ran into a chimney. It was easy to put out the fire with a fire extinguisher. There was no damage, and we only had to clean off the white powder. We called the fire department to verify it was out, and it was! I'm glad we knew how to use a fire extinguisher and we avoided a big fire!

G. **4.4** The stand was broken off the torch my foreman gave me to use. I fixed the stand before relighting the torch.

H. **4.1** My boss is able to get good insurance to do torching work, and I can get more work because I got certified in the CERTA program.

I. **1.1** Before we started working today, our foreman walked over the section of the roof he was planning to do and filled out some important paperwork. I know it is important to go over this checklist every day because conditions can change from one day to the next.

J. **3.2.4.1** I am installing flashings on a parapet wall. There is a wood nailer in the brick near the old wood deck. I know I need to cover this flashing area first with an approved backer ply.

K. **4.5** My foreman told me to go down to the truck and bring up a box of tin-capped nails so we can nail the flashings. I will shut off my torch before I go down to the truck.

L. **2.4** My foreman told the crew he programmed the telephone number of the local fire department into his cell phone in case there is an emergency.

M. **4.3** I have to torch materials over a concrete wall. There is a louvered vent coming out of the wall where I have to work. I will cover the entire vent using a fire blanket to make sure no flames get into the opening.

N. **2.1.2** I found an old unused wood curb hidden under a metal counterflashing in an area where everything else was metal. I will address this hazard by removing the old wood curb before using a torch.

O. **5.1** My company put me through special training to help identify hidden fires that sometimes smolder under a roof. I call these areas "hot spots." I stay on a roof at least two hours after we shut off the last torch. I watch for hot spots, smoke or other clues a fire might be smoldering.

P. **2.2** I am working with a crew of six to install torch-applied flashings near the northwest corner of a roof. When we are working close together, we need two fire extinguishers present. But when I work alone on another area of the roof, I need two fire extinguishers just for my torch.

Q. **3.2.4.2** I am installing torch-applied flashings around an air-conditioner curb. The curb is metal. I installed a backer ply (either hot-mopped or self-adhering) with sealed laps. I now can carefully install the flashing strips onto the curb using a small detail torch and the direct-torching method.

Section 2 Hazard Identification

SECTION INTRODUCTION

OUTCOMES Upon completing this unit, participants will be able to:

1. Identify common fire hazards encountered during torch-applied installations
2. Prescribe application methods that reduce fire risk when torching near hazardous areas

TIMING This unit consists of three sections:

A. Student Hazard Identification Exercise (15 minutes)

B. Class Review of Hazard Identification Exercise (30 minutes)

C. Set Up Participants for Hands-on Exercise (15 minutes)

Total Unit Time: 60 minutes

MATERIALS

Student manuals

Clock with second hand, or stopwatch

One event card for each participant

FACILITATION GUIDE

Sec.	Notes and Materials	Directions and Discussion
A	Student Hazard Identification Exercise **(15 minutes)**	
	 	**Direct** the students to turn to **page 8 (Spanish page 8)** of their student manuals. **Explain** that there are 20 pictures. Students are to look at each picture; identify what they think is the fire hazard being represented; and write a brief description of the hazard on the lines next to each picture. **Direct** students also to write what they think they should do to reduce the fire hazard. **Ask** a student to review and read the first example picture and answer given on **page 8.** **Confirm** their understanding of the exercise by asking if anyone has a question about the instructions. **Tell** students they have 15 minutes to complete the exercise and you will time the exercise. Do not mention that you will be conducting a review of their answers. **Time** the exercise. Call out **STOP** when the 10 minutes has elapsed.
B	Class Review of Hazard Identification Exercise **(30 minutes)**	
		**Tell** a student to read his or her answer to picture No. 2. **Ask** the student to explain why the course of action described in his or her answer could reduce the fire hazard. **Use** good questioning skills when conducting this type of review. **Continue** around the room, having the rest of the students read the remaining answers, one per student, until all pictures and descriptions have been read and discussed.
C	Set Up Participants for Hands-on Exercise **(15 minutes)**	
	 	**Photocopy,** cut out and stack the event cards (one for each participant) into a deck. Event cards are found on **page 23** of this instructors guide. Shuffle the cards to create a random order of events. **Tell** participants they each will be required to complete four hands-on exercises, including: 1. Lighting a torch (Event 1) 2. Flashing torch and flop (Event 2) 3. An event card assignment 4. Shutting off the torch (Event 8) **Direct** participants to **pages 21 and 22 (Spanish pages 21 and 22)** in the appendix of their student manuals and have them remove the Hands-on Performance Evaluation Form. **Tell** participants to write their name as the torch operator and the training date at the top of the evaluation form. **Instruct** students to each draw one card from the deck. This provides each student with an event assignment. One or two students may receive an Event Wild Card. Allow these students to choose the event they wish to perform, only allowing them to choose between events three through seven.

		Tell students to write their event number at the top of the evaluation form. **Count off** students and break them into four teams numbered 1 through 4. For a 20-person session, the result will be four teams of five people. **Remind** students to remember their team number.

Hands-on Training Requirements, Policies and Procedures

SECTION INTRODUCTION

The hands-on section of this CERTA recertification program is essentially the same as the original CERTA applicator program. The only significant difference is that students will be required to perform only four torch-and-flop exercises, randomly chosen, whereas they were required to perform eight exercises in the original program.

OUTCOMES Upon completing this unit, participants will be able to demonstrate the following:

1. Proper torch-lighting procedures.
2. Proper torch shut-down procedures.
3. Application of self-adhering base ply with a focus on ensuring sealed laps, using the flashing box mock-up.
4. Flashing torch-and-flop application using the flashing box mock-up.
5. Flashing direct torching application using the flashing box mock-up and a detail application-size (105k Btu or less) torch.
6. Proper starting of field membrane rolls at roof edges or walls.
7. Torch-and-flop method for going around a pipe penetration and a drain.
8. Torch-and-flop method for installing field sheet over the drain penetration.
9. Torch-and-flop method for ending field membranes at roof edges or walls.
10. Ability to evaluate and rate others' torching behaviors.

TIMING This unit is divided into four sections:

A. Hands-on workstation setup

B. Instructor demonstrations

C. Participant exercises

D. Program wrap-up

Total Unit Time: 120 minutes (2 hours)

MATERIALS

Scheduled materials and equipment checklists

Torching equipment (from checklist), circular saw, hammer, carpenters square, screw gun

Hands-on Exercises Schedule		
Event		
8	**Hands-on Instruction: Instructor Demonstrations of Torch Lighting**	**4 minutes**
	8-1: Lighting Procedures	2 minutes
	8-2: Shutting Down Torch	2 minutes
9	**Hands-on Instruction: Instructor Demonstration of Applying Self-adhering Base Ply**	**5 minutes**
10	**Hands-on Instruction: Instructor Demonstration of Flashing Torch and Flop**	**10 minutes**
11	**Hands-on Instruction: Instructor Demonstration of Field Torch-and-flop Applications**	**20 minutes**
	11-1: Starting Rolls at Roof Edges or Walls	5 minutes
	11-2: Interior Roof Drain	6 minutes
	11-3: Penetration	5 minutes
	11-4: Finishing Rolls at Roof Edges or Walls	4 minutes
12	**Hands-on Instruction: Participant Torch Exercise Rotation and Evaluation**	**76 minutes**
	12-1, Station 1 and 2: Flashing Torch and Flop	38 minutes
	12-2, Station 3 and 4: Field Applications Torch and Flop	38 minutes
13	**Program Wrap-up**	**5 minutes**
	Total Hands-on Exercises Scheduled Time	**120 minutes (2 hours)**

FACILITATION GUIDE

A	**Hands-on Workstation Setup** **(Prepare before conducting training session.)**	
	Materials and Equipment Lists	**Identify** the training location, and be sure it will meet all the safety requirements (e.g., ventilation, fire protection). **Gather** all materials, tools and equipment together for the training session. Use the table provided at the end of this section. **Decide** on mock-up locations, taking into consideration all safety requirements. Weather permitting, always try to conduct hands-on exercises outdoors, but have a backup location identified in case the weather does not cooperate. **Build mock-ups.** You will provide four fully equipped mock-up stations for students to perform hands-on training exercises. Refer to mock-up drawings on **pages 19** to **22** of this section. Basic roof deck mock-ups are constructed using 2x4 dimensional lumber, ½-inch plywood and high-density wood fiberboard roof insulation. Flashing boxes are constructed of 2- by 12-inch or 2- by 14-inch dimensional lumber.

	Materials and Equipment Lists	Roll out heavy fiberglass base sheets to protect concrete floors. Extend the sheets a minimum of 3 feet beyond each side of where the roof deck and flashing box mock-ups will be set after the sheets are laid. Place propane cylinders a minimum of 10 feet from each workstation. Place two 4A60BC fire extinguishers centrally located near the mock-up stations. **Prepare** all torching equipment. Assemble torch assemblies, and test them for leaks. Or, if you decide to extend the shop time, you may have participants do the assembling and leak testing under your supervision. **Distribute** all roofing materials at each workstation. Pre-cut enough base plies and flashing strips before a session. There will only be time for participants to do this as part of their exercise if you extend the time. Cutting flashing membranes is not a skill this program addresses.
B	**Conduct Hands-on Exercise Demonstrations** **Total 40 minutes** **Have students read aloud the step-by-step instructions to you during your demonstration. The instructions can be found in the evaluation checklist on pages 21 and 22 (Spanish pages 21 and 22) of the student manual.**	
8		*Event 8 (4 minutes)* **8-1:** 2 minutes: Demonstrate proper torch-lighting procedures. **8-2:** 2 minutes: Demonstrate proper torch shutdown procedures.
9		*Event 9 (5 minutes)* **(stations 1 or 2)** Demonstrate proper application of self-adhering base ply with a focus on ensuring sealed laps, using the flashing box mock-up.
10		*Event 10 (10 minutes)* **(stations 1 or 2)** Demonstrate flashing torch-and-flop application using the flashing box mock-up.
11		*Event 11 (20 minutes)* **(stations 3 or 4)** **11-1:** Demonstrate proper starting of field membrane rolls at roof edges or walls. **11-2:** a. Demonstrate the proper torch-and-flop method for going around a pipe penetration. b. Demonstrate the proper torch-and-flop method for installing a target flashing sheet around an interior drain. **11-3:** Demonstrate the proper torch-and-flop method for installing field sheet over the drain penetration. **11-4:** Demonstrate the proper torch-and-flop method for ending field membranes at roof edges or walls.

C	**Supervise and Evaluate Participants' Performance of Hands-on Exercises** **Total 75 minutes (1 hours, 15 minutes)**	
12	 **Hands-on Exercise Evaluation Forms**	**Explain** to participants they can fail the hands-on part of this course. They are being evaluated by their peers on how well they perform their torching events following the listed criteria on the evaluation form. Although there are 66 individual listed items, *each participant only needs to complete the items listed for the following events:* 1. Lighting a torch (Event 1—nine items) 2. Flashing torch and flop (Event 2—seven items) 3. An event card assignment (number of items varies) 4. Shutting off the torch (Event 8—five items) **Explain Reasons for Failure.** Reasons for automatic failure include: 1. Smoking within 50 feet of a propane cylinder 2. Scoring a **1** on any one of the seven "never touches the _____ with a flame" items 3. Injuring himself or herself or another participant, whether intentional or not 4. Engaging in unruly behavior or misconduct as determined by the authorized instructor A participant also fails this hands-on evaluation if he or she scores a **1** on **12** or more items. **Position** each team at one of the four workstations. Field mock-ups will use field-sized torch assemblies, and flashing box mock-ups will use detail-sized torch assemblies. **Explain** that each team has 38 minutes to complete the events at the workstation. That means for a team of five, each participant has about seven and one-half minutes to perform his or her events for that workstation. **Rotate** participants at their workstation until all team members have finished their events. **Tell** students to evaluate one another in a positive and constructive manner, providing feedback to the torch operator. Remind them they should not inject personal opinions about ways they were taught or shortcuts they may know nor should they suggest that their experience is a better way to do a task. Remind each team that feedback needs to be objective, constructive and positive in tone. **Monitor** each group's evaluation feedback to ensure positive, constructive feedback is being given. You may also add your own feedback.

		Explain to the evaluators they need to agree on a performance grade for the torch operator for each item and circle the appropriate number for each item listed. If an operator performs poorly, discuss with the other team members how to assist the operator as time allows. The objective here is to teach operators safe torching habits. **Keep** a close eye on all exercises, and maintain order. Do not allow horseplay or other inappropriate behavior.
12-1		**Station 1 and 2: Flashing torch-and-flop exercise with flashing boxes— 38 minutes simultaneous with event 12-2** Participant 1—performs the flashing torch-and-flop application by following the step-by-step instructions on the evaluation form. This will include properly lighting and shutting down a torch assembly. Participant 2—performs fire-watch duty while others are torching. Performs no other duties during the fire watch. This person has the authority to stop an exercise if a fire risk is observed. Participants 3, 4 and 5—observe that participant 1 is performing the torching sequence properly following the step-by-step instructions on the evaluation form. This includes never allowing a flame to touch a flashing box. At the end of the first 38-minute exercise, groups exchange places with workstations 3 and 4 to begin the second round of simultaneous exercises.
12-2		**Stations 3 and 4: Field mock-up exercise for starting and ending rolls and installing around penetrations using flat field mock-ups— 38-minute exercise simultaneous with 12-1** Participant 1—performs only the torch-and-flop field application tasks listed on the event card, following the step-by-step instructions provided on the evaluation forms. These tasks include: • Starting rolls at a roof edge or wall • Installing a target sheet over the roof drain area • Installing the field membrane over the roof drain area • Installing the field membrane around a pipe penetration • Ending the roll at a roof edge Participant 2—performs same fire-watch duty as described in 12-1. Participants 3, 4 and 5—conduct evaluations as described in 12-1.

D	**Program Wrap-up** **(5 minutes)**	
13		**Instruct** participants to fill out the program evaluation form found on **pages 23 and 24 (Spanish pages 23 and 24)** in the appendix of their student manuals. Encourage participants to fill out these forms and email them to CERTAadmin@nrca.net or mail them to NRCA. **Confirm** you have all the personal information you will need to complete your roster sheet. **Inform** participants you will distribute their recertification cards as soon as you receive them. Remember the tasks you need to do: Grade their exams, tabulate their torching performance evaluation forms, submit the session roster, and wait two to four weeks for NRCA to process and mail the recertification cards to you. **Thank** everyone for participating.

Equipment and Materials Requirements

Hands-on Training Mock-up Construction Materials

√	Quantity	Unit	Description
			Mock-up Construction
	192	Square feet	¼-inch fiberglass mat-faced gypsum core panel
	3	Sheets	4-foot-by-8-foot-by-½-inch CDX plywood
	15	Each	2x3 or 2x4 dimensional lumber by 45-inch length
	6	Each	2x3 or 2x4 dimensional lumber by 8-foot length
	2	Each	2- by 12- or 14-inch construction-grade dimensional lumber by 12-foot length
	150	Each	1¼-inch general purpose screws
	100	Each	16 penny nails
	50	Each	¾-inch tin-capped roofing nails
	2	Each	9-inch metal pie tins, large coffee cans or galvanized tall cone flashing
	2	Each	4-inch-diameter steel pipe by 10- or 12-inch length
	2	Each	½-inch plywood circles cut to 4-inch O.D. pipe size
	2	Each	12-inch wood screws

Hands-on Training Roofing Materials

			Roofing Materials: 20 participants
	1	Roll	Heavy fiberglass base sheet (#75-type)
	1	Roll	Self-adhering smooth-surfaced polymer-modified base sheet
	3-4	Rolls	APP polymer-modified bitumen membrane—smooth or granulated
	8	Each	Wood-fiber cant strips—3-foot lengths
	1	Box	Arrow T-50 staples for staple gun (or equivalent)
	10	Each	Hooked blades for roofing knives
	1	Bottle	Liquid soap (for leak-detecting solution)

Hands-on Training Roofing Equipment

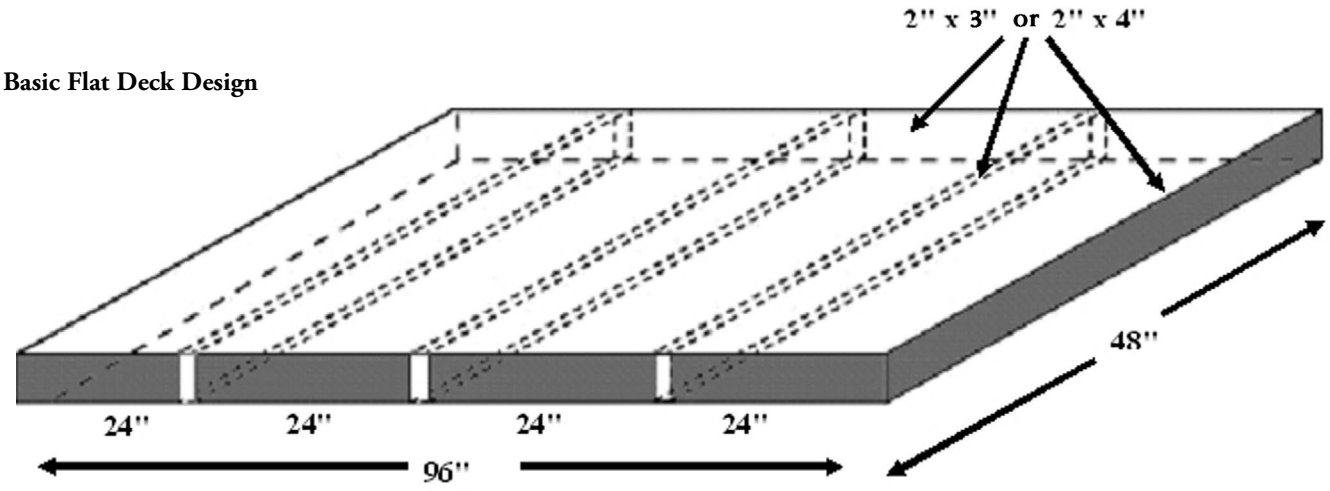
√	Quantity	Unit	Description
	4	Each	20-pound vapor LP gas cylinders
	4	Each	Pressure regulators
	4	Each	Pressure gauges
	4	Each	25-foot UL-listed hoses
	4	Sets	Swivel-type connectors for torch assemblies

√	Quantity	Unit	Description
	2	Each	Propane roofing torches—detail application size not to exceed 105K Btu
	2	Each	Propane roofing torches—field application size
	4	Each	Spark-type igniters
	2	Each	Adjustable wrench
	1	Each	Flat-blade screwdriver (for changing knife blades)
	4	Each	Utility-type roofing knives
	1	Each	Arrow T-50 staple gun (or equivalent)
	4	Each	Large round-nosed trowels
	2	Each	4A60BC fire extinguishers, fully charged, with updated inspection tags and intact plastic seals
	1	Each	Comprehensive first-aid kit
	1	Each	Clean plastic 5-gallon pail (for water)
	1	Each	Small plastic squirt bottle
	5	Each	ANSI Z-87 goggles (eye protection)
	5	Pair	Leather-palmed heavy work gloves (hand protection)

Mock-up Design, Construction and Setup

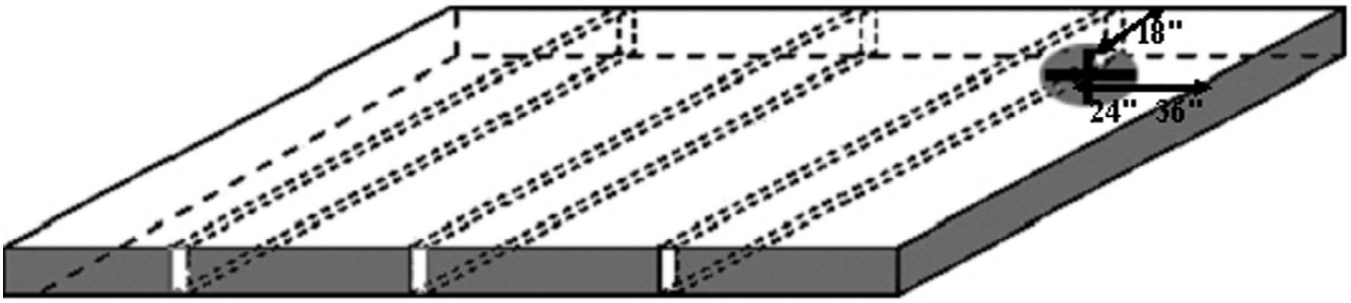
These drawings represent mock-ups you will need to construct before conducting the hands-on training for this program. These mock-up designs are the same used for the original CERTA applicator training program.

Basic Flat Deck Design



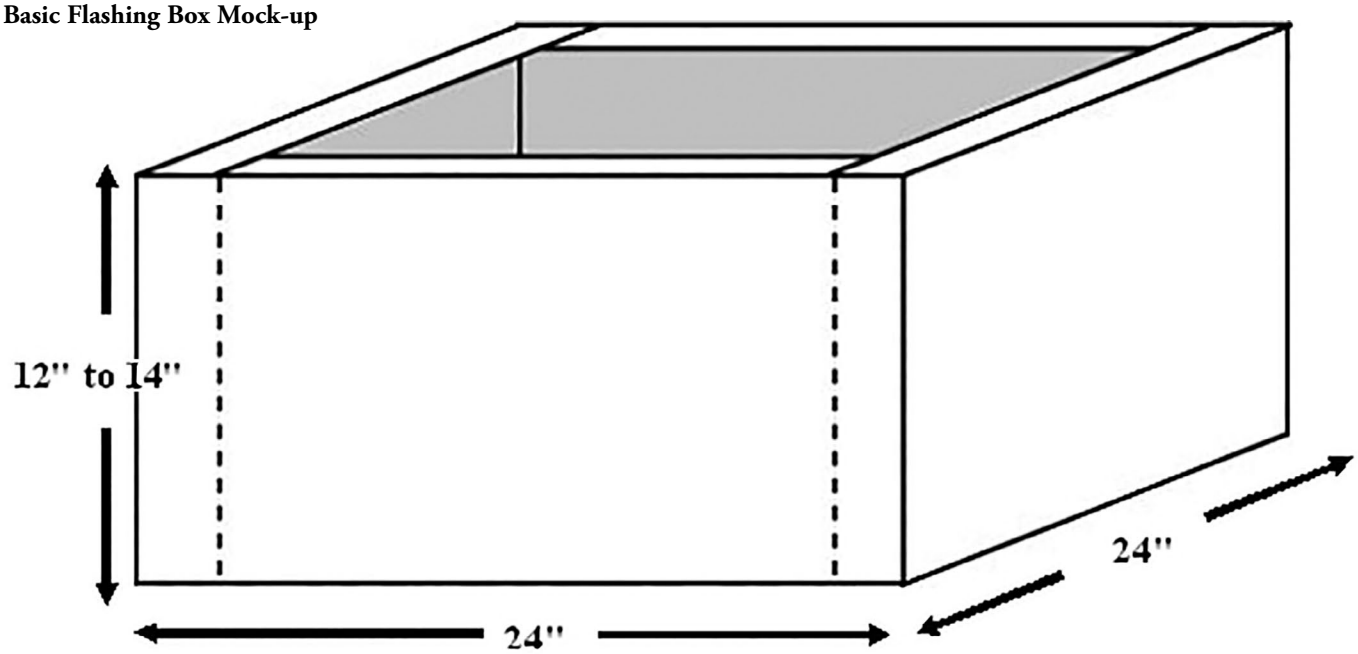
Construct basic flat deck using 2x3 or 2x4 dimensional lumber secured with 16d nails as shown here. Install one layer ½-inch minimum CDX plywood to deck over the frame, secured 8 inches on center with 1¼-inch general purpose screws. Install two layers of ¼-inch fiberglass mat-faced gypsum core panel roof insulation secured with ¾-inch tin-capped nails over the plywood. You will need to construct three basic flat deck mock-ups to conduct the hands-on training exercise.

Simulated Roof Drain



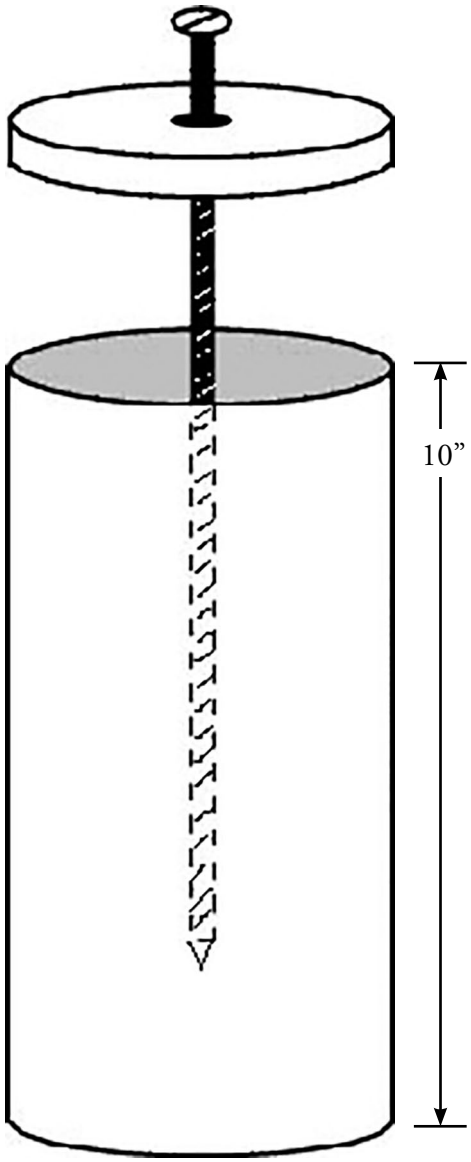
Cut a hole 18 inches from one side and 18 to 24 inches from one end in two of the three basic flat deck mock-ups. Use a 9-inch metal pie tin, a large coffee can or an inverted galvanized steel tall cone flashing cut to height to simulate a roof drain opening. Secure the simulated roof drain in the hole.

Basic Flashing Box Mock-up



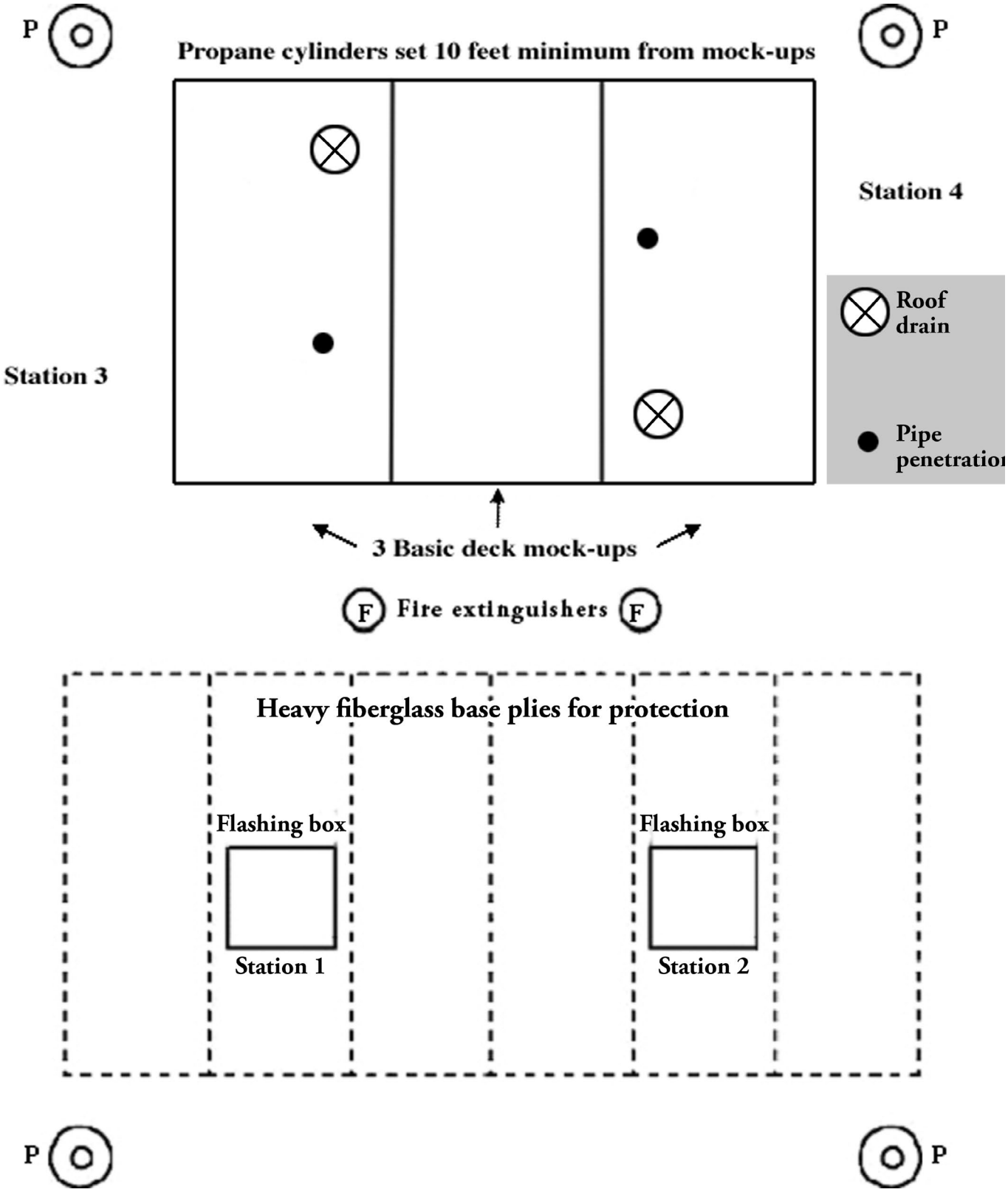
Construct basic flashing box mock-up using four pieces of 2- by 12- or 14-inch dimensional lumber nailed together using 16d nails. Add new cant strips for each training session.

Basic Pipe Penetration Mock-up



Construct basic pipe penetration mock-up using a minimum 10-inch length of 3- or 4-inch pipe, a circular plywood disk cut to the size of the outer pipe diameter and a screw 2 inches longer than the pipe length. Drill a hole near the center of the plywood disk to accept the screw. Secure the basic pipe penetration mock-up at the opposite end of the basic deck mock-up approximately 18 inches from one side and 24 inches from the end. The basic pipe mock-up can easily be removed for storage.

Mock-up Station Layout Plan



Lay the three basic deck mock-ups side by side with the two drain openings at opposite ends. Cover over entire basic deck mock-up layout using heavy fiberglass base ply sheet stapled into place. Lay fiberglass base ply ground protection for Stations 1 and 2 flashing box areas. Set flashing boxes approximately 8 to 10 feet apart. Install cant strips around flashing boxes. Cover flashing boxes and cant strip using heavy fiberglass base ply sheets stapled securely in place. Set two 4A60BC fire extinguishers between the workstations. Set a 20-pound propane tank a minimum of 10 feet away from each workstation.

EVENT 4:
Installing target sheet at drain

EVENT 6:
Installing field membrane around pipe penetration

Event Wild Card
EVENT ___:
You get to choose!

EVENT 3:
Starting field membranes at roof edges or walls

EVENT 5:
Installing field membrane over drain

EVENT 7:
Ending field membranes at roof edges and walls

EVENT 3:
Starting field membranes at roof edges or walls

EVENT 4:
Installing target sheet at drain

EVENT 5:
Installing field membrane over drain

EVENT 6:
Installing field membrane around pipe penetration

EVENT 7:
Ending field membranes at roof edges and walls

Event Wild Card
EVENT ___:
You get to choose!

EVENT 4: Installing target sheet at drain	**EVENT 6: Installing field membrane around pipe penetration**	**Event Wild Card EVENT ___: You get to choose!**
EVENT 3: Starting field membranes at roof edges or walls	**EVENT 5: Installing field membrane over drain**	**EVENT 7: Ending field membranes at roof edges and walls**

EVENT 3:
Starting field membranes at roof edges or walls

EVENT 4:
Installing target sheet at drain

EVENT 5:
Installing field membrane over drain

EVENT 6:
Installing field membrane around pipe penetration

EVENT 7:
Ending field membranes at roof edges and walls

Event Wild Card
EVENT ___:
You get to choose!