

NHFA FIREFIGHTER I COURSE GUIDE

CHAPTER 14: VENTILATION

CHAP	SKILL DRILL	SKILL #	STAND. EVOL. #
14	Positive Pressure Ventilation	14-1	
14	Negative Pressure Ventilation	14-2	
14	Hydraulic Ventilation	14-3	
14	Venting a Window or Glass Door	14-4	
14	Venting a Window From a Ground Ladder	14-5	
14	Sounding A Roof	14-6	
14	Inspection Hole – Halligan Punch	14-7	
14	Inspection Hole – Kerf Cut	14-8	
14	Triangular Cut	14-9	
14	Coffin Cut (7, 9, 8)	14-13	
14	Breaching a Floor	14-17	
	VEIS Combine Skills		14SE-6S1



**NH FIRE ACADEMY FIREFIGHTER I
UNIT 14, BLOCK 1 (4HR)**

CLASS NAME: VENTILATION

NUMBER OF INSTRUCTORS: 6

EQUIPMENT NEEDED	<ul style="list-style-type: none"> • 2 Smoke ejectors (electric) • Generator or power supply • 1 Positive Pressure Fan • 2 smoke generators • Air Supply • 3 lengths of 1 ¾ " hose • Combination nozzle • 24' or 28' extension ladder • 2 chain saws with tools for conducting an inspection of the saws • 12 pallets for cutting operations
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FACILITY NEEDED	A two story building with 3-4 rooms equipped with interior and exterior doors, water supply with sufficient flow and pressure for hydraulic ventilation or an engine with an adequate water source and a pitched roof ventilation prop
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SKILL DRILL REFERENCE	14-1	14-2	14-3	14-4	14-5	14-6	14-7	14-8	14-9
	14-13	14-17							

GENERAL INSTRUCTION	<p>Divide the class into 3 groups. Assign a group to each station and rotate through the stations until all students have completed all four stations.</p> <p>It is important that the Instructors and students be given sufficient rehabilitation during this class.</p> <p>Student shall wear all the required PPE/SCBA that would normally be used during an emergency. All Instructors shall wear full PPE/ SCBA while operating in smoke areas to insure that they are safe and to reinforce the message presented to the students concerning the appropriate use of PPE.</p>
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**NH FIRE ACADEMY FIREFIGHTER I
UNIT 14 BLOCK 1 (4HR)**

EVOLUTION	DESCRIPTION
Mechanical & Hydraulic Ventilation	<p>Working with the students the instructor shall demonstrate negative ventilation. The area must be at least two rooms separated by doors. The rooms will be filled with smoke generated by a smoke generator. Skill Drill 14-2</p> <p>Working with the students the instructor shall demonstrate positive ventilation. The area must be at least two rooms separated by doors. The rooms will be filled with smoke generated by a smoke generator. Skill Drill 14-1</p> <p>The instructor shall demonstrate how to hydraulically ventilate a room through a window. The instructor will utilize a charged hand-line. The room should be filled with smoke generated by a smoke generator.</p> <p>Each student shall demonstrate how to hydraulically ventilate a room through a window. The instructor will utilize a charged hand-line. The room should be filled with smoke generated by a smoke generator. Skill drill 14-3</p>
Roof Inspection and Venting	<p>Working with the students the instructor shall demonstrate how to sound a roof, access a flat and pitched roof and perform various cuts to ventilate the roof. The instructor shall demonstrate and have each student demonstrate how to cut a ventilation hole and clear a ceiling below. Skill drill 14-6, 14-7, 14-8, 14-9, and 14-13</p>
Venting a Floor and window or glass door	<p>The Instructor shall demonstrate the proper way of venting a floor and a window or glass door. The Instructor shall demonstrate ventilating a window from a ground ladder.</p> <p>The students shall demonstrate the proper way of venting a floor and a window or glass door. The students shall demonstrate the use of a ladder for ventilating a window on an upper floor Skill drills 14-4, 14-5 and 14-17</p>

14SE-#S1 Vent, Enter, Isolate, and Search (VEIS)

Objective: Vent a second floor window, enter, isolate the room, search, locate and remove the victim

Skill Drills: 13-28, 13-30, 13-39, 13-40, 17-9, 19-2, 19-13

Introduction:

VEIS is more effective when pre-determined positions with specific functions have been established. The two positions are Searcher and Point Person with two additional members remaining exterior to help with extricating a victim if necessary.

Directive:

Wearing full PPE/SCBA students will be divided into teams of two or three if necessary. The students will carry a 24' extension ladder to a second floor window. Raise the ladder to ventilate the window (raise the ladder high enough to through the tip into the window). Then reposition the ladder for rescue operation.

The searcher is responsible for entering the room first (clear the window, observe room conditions, sound the floor, and immediately control the door). The search should remain in constant communication with the point person.

The point person serves as a "lookout". This position should be in constant contact with the searcher. They remain on the ladder at the window with a thermal imaging camera in hand. Their responsibility is to monitor conditions of the room and building, and communicate information to the searcher. Once the searcher locates a victim the point person enters and assists with victim removal back to the window. The point person then exits via the ladder to receive the victim to extract them down the ladder.

Instructor Notes:

Instructors need to emphasize that going into a structure without a charged hose-line is extremely dangerous and the benefit needs to out weight the risk.

Students are divided into 4 groups of 6. Students shall be on air with obscured vision when entering the structure. Students shall don their regulators before entering the structure. There will be NO FIRE or SMOKE used for this evolution at this time. Students still need guidance and coaching as this will be their first time combining several skill into one exercise. Students will be required to communicate to their team member and command.

If at any time a student removes their face piece, runs out of air, or conducts a major safety error the team will be required to redo the exercise.

FIRE ENGINEERING'S HANDBOOK FOR FIREFIGHTER I & II
Instructor Curriculum Skill Evaluation Sheet

SKILL SHEET 14-1		Positive Pressure Ventilation	
OBJECTIVE:		NFPA 1001, 4.3.11	FEH Chapter: 14
CANDIDATE NAME/NUMBER:			No.:
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]		<ul style="list-style-type: none"> • Personal protective equipment • Self-contained breathing apparatus • Fan or smoke ejector with hangers and bar • Power line 	
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS: <i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>		In this evaluation you will be expected to demonstrate how to ventilate a room or space using a fan or blower for positive pressure ventilation.	
CRITERIA:		NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]	
Critical?		Pass	Fail
	Wears full protective equipment properly		
	Selects proper point of entry		
	Selects proper exit point to remove smoke (other areas should be closed)		
	Properly positions fan to completely cover entry with cone of air		
	Properly connects to power source (if applicable)		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

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SKILL SHEET 14-2		Negative Pressure Ventilation	
OBJECTIVE:		NFPA 1001, 4.3.11	FEH Chapter: 14
CANDIDATE NAME/NUMBER:			No.:
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]		<ul style="list-style-type: none"> • Personal protective equipment • Self-contained breathing apparatus • Fan or smoke ejector with hangers and bar • Power line 	
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS: <i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>		In this evaluation you will be expected to demonstrate how to ventilate a room or space using a fan or smoke ejector.	
CRITERIA:		NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]	
Critical?		Pass	Fail
	Wears full protective equipment properly		
	Ensures proper placement in opening (same direction as natural wind)		
	Removes any material that might disrupt air flow (if applicable)		
	Covers area around fan to prevent churning		
	Connects to power properly		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

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SKILL SHEET 14-3		Hydraulic Ventilation	
OBJECTIVE:		NFPA 1001, 4.3.11	FEH Chapter: 14
CANDIDATE NAME/NUMBER:			No.:
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]		<ul style="list-style-type: none"> • Personal protective equipment • Self-contained breathing apparatus • Charged hose-line (1½-inch minimum) 	
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS: <i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>		In this evaluation you will be expected to demonstrate how to ventilate a room or space using a hose-line.	
CRITERIA:		NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]	
Critical?		Pass	Fail
	Wears full protective equipment properly		
	Verbalizes proper methodology to perform task for various nozzles used by AHJ		
	Selects and demonstrates proper pattern to cover 85 to 90% of window or door opening		
	Selects proper distance from opening for maximum effectiveness		
	Closes nozzle slowly		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

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SKILL SHEET 14-4		Venting a Window or Glass Door	
OBJECTIVE:	NFPA 1001, 4.3.11	FEH Chapter: 14	
CANDIDATE NAME/NUMBER:		No.:	
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]	<ul style="list-style-type: none"> • Pike Pole • PPE & SCBA 		
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS:	Student will demonstrate venting a window or glass door.		
<i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>			
CRITERIA:	NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]		
Critical?		Pass	Fail
	Wearing full PPE, use the full reach of a tool to break the glass and remove all cross members and window frames.		
	Using the tool, pull down and remove any other objects obstructing the window such as drapes or blinds.		
	Run the tool along the edges of the window to ensure that all glass and sharp objects have been removed.		
	This window is now efficiently ventilating the structure and is also an effective exit point for any firefighters within the structure. This same procedure can be used with door glass to help in forcible entry. Remember when doing so that you have ventilated the structure.		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

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Instructor Curriculum Skill Evaluation Sheet

SKILL SHEET 14-5		Venting a Window from a Ground Ladder	
OBJECTIVE:		NFPA 1001, 4.3.11	FEH Chapter: 14
CANDIDATE NAME/NUMBER:			No.:
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]		<ul style="list-style-type: none"> • Pike Pole • PPE & SCBA • Ground Ladder 	
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS:		The student shall simulate venting the window	
<i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>			
CRITERIA:		NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]	
Critical?		Pass	Fail
	The candidate places the ladder next to the window on the upwind side.		
	The firefighter ascends the ladder with a pike pole. Upon reaching the proper working height, the firefighter performs an appropriate leg lock.		
	The arm that is farthest from the window to be ventilated is placed between the two rungs directly in front of the firefighter. This hand grabs the butt of the pike pole. The other hand holds the pike pole from the outside of the beam.		
	The firefighter then positions the pike pole to the window, checking the swing. The firefighter then breaks the window, clearing as much of the window as possible.		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

FIRE ENGINEERING'S HANDBOOK FOR FIREFIGHTER I & II
Instructor Curriculum Skill Evaluation Sheet

SKILL SHEET 14-6		Sounding a Roof for Integrity	
OBJECTIVE:		NFPA 1001, 4.3.12	FEH Chapter: 14
CANDIDATE NAME/NUMBER:			No.:
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]		<ul style="list-style-type: none"> • Roof or roof prop • Pike pole or other tool • Ladder • PPE & SCBA 	
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS:		Student will demonstrate sounding the roof for integrity.	
<i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>			
CRITERIA:		NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]	
Critical?		Pass	Fail
	Using a tool, sharply strike the roof.		
	Listen and feel for any issues. Student describes the integrity of the roof and what the sound and feel of the tool indicates.		
EVALUATOR COMMENTS:			
[ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

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Instructor Curriculum Skill Evaluation Sheet

SKILL SHEET 14-7	Inspection Hole: Halligan Punch		
OBJECTIVE:	NFPA 1001, 4.3.12	FEH Chapter: 14	
CANDIDATE NAME/NUMBER:		No.:	
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]	<ul style="list-style-type: none"> • Roof or roof prop • Halligan Tool • Ladder • PPE & SCBA 		
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS:	Student will perform a Halligan punch.		
<i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>			
CRITERIA:	NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]		
Critical?		Pass	Fail
	Use the spike end of the Halligan, poke pole, or similar tool, to punch a hole into the roof.		
	If needed, clear the shingles and debris from the hole.		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

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Instructor Curriculum Skill Evaluation Sheet

SKILL SHEET 14-8		Inspection Hole: Kerf Cut	
OBJECTIVE:		NFPA 1001, 4.3.12	FEH Chapter: 14
CANDIDATE NAME/NUMBER:			No.:
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]		<ul style="list-style-type: none"> • Roof or roof prop • Power Saw • Ladder • PPE & SCBA 	
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS:		Student will perform a kerf cut.	
<i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>			
CRITERIA:		NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]	
Critical?		Pass	Fail
	Using the saw simply to plunge the blade into the roof, then pull it back out. This creates a slit in the roof.		
	Examine the slit for smoke or fire.		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

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Instructor Curriculum Skill Evaluation Sheet

SKILL SHEET 14-9		Triangular Cut	
OBJECTIVE:		NFPA 1001, 4.3.12	FEH Chapter: 14
CANDIDATE NAME/NUMBER:			No.:
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]		<ul style="list-style-type: none"> • Roof or roof prop • Power Saw • Ladder • PPE & SCBA 	
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS:		Student will perform a triangular inspection cut.	
<i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>			
CRITERIA:		NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]	
Critical?		Pass	Fail
	This method allows the firefighter to cut the triangular cut without moving their feet. Some departments advocate relocating your stance in order to avoid cutting toward their body. Always follow your department's SOPs.		
	Taking a boxer's stance, make the first cut starting in the center and cutting down toward your right boot.		
	Next, cut vertically, starting at the top of the first cut and cutting downward to the center of your stance. Make sure to overlap cuts.		
	The third cut is horizontal, going from left to right overlapping the bottom of the first two cuts, creating the bottom leg of the triangle. When creating an inspection hole, make sure the hole is not large enough for a firefighter to fall through.		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

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Instructor Curriculum Skill Evaluation Sheet

SKILL SHEET 14-13	Coffin Cut		
OBJECTIVE:	NFPA 1001, 4.3.12	FEH Chapter: 14	
CANDIDATE NAME/NUMBER:		No.:	
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]	<ul style="list-style-type: none"> • Roof or roof prop • Power Saw • Ladder • Pike Pole • PPE & SCBA 		
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS:	Student will perform a coffin cut.		
<i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>			
CRITERIA:	NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]		
Critical?		Pass	Fail
	When performing a coffin cut, one must remember the numbers 7, 9, 8.		
	Make two cuts in the roof, resembling a 7, being sure to stay on the outside of the number, creating knockouts for the corner. The top of the 7 is approximately 4 ft. long, and the side of the 7 is approximately 8 ft. long		
	Enclose the 7, with two more cuts, to create a shape resembling a 9, keeping in mind that you need to stay on the outside of the cutting area.		
	Last, enclose the 9 with two more cuts, which will resemble an 8. Create knockout holes as necessary.		
	When ordered to do so, pull up the two pieces, creating a large 4-ft by 8-ft vent section.		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			

FIRE ENGINEERING'S HANDBOOK FOR FIREFIGHTER I & II
Instructor Curriculum Skill Evaluation Sheet

SKILL SHEET 14-17	Breaching a Floor		
OBJECTIVE:	NFPA 1001, 4.3.12	FEH Chapter: 14	
CANDIDATE NAME/NUMBER:		No.:	
TEST DATE/TIME			
EQUIPMENT REQUIRED: [Add local requirements if needed]	<ul style="list-style-type: none"> • Axe • Pike Pole • PPE & SCBA 		
EVALUATOR INSTRUCTIONS			
CANDIDATE INSTRUCTIONS:	The student will breach a floor.		
<i>NOTE: The evaluator will read the following exactly as it is written to the candidate</i>			
CRITERIA:	NOTE: Based on material from the Skill Drill Instructor Guides [ADDITIONAL LINES FOR AHJ TO ADD OTHER MATERIAL]		
Critical?		Pass	Fail
	Make sure the area is clear and, if necessary, remove any floor covering to reveal the wooden floor. Power saws are typically used, but an axe and Halligan may also be used.		
	Strike close to the beam with the axe blade hitting at an angle to allow penetration into the hardwood.		
	Use prying tools to help if it is a masonry floor. Special tools may be needed; consider the risk versus benefit of each tool.		
EVALUATOR COMMENTS: [ANY COMMENTS PRO OR CON REGARDING WHAT THE STUDENT ACCOMPLISHED]			
EVALUATOR SIGNATURE:			
STUDENT SIGNATURE:			