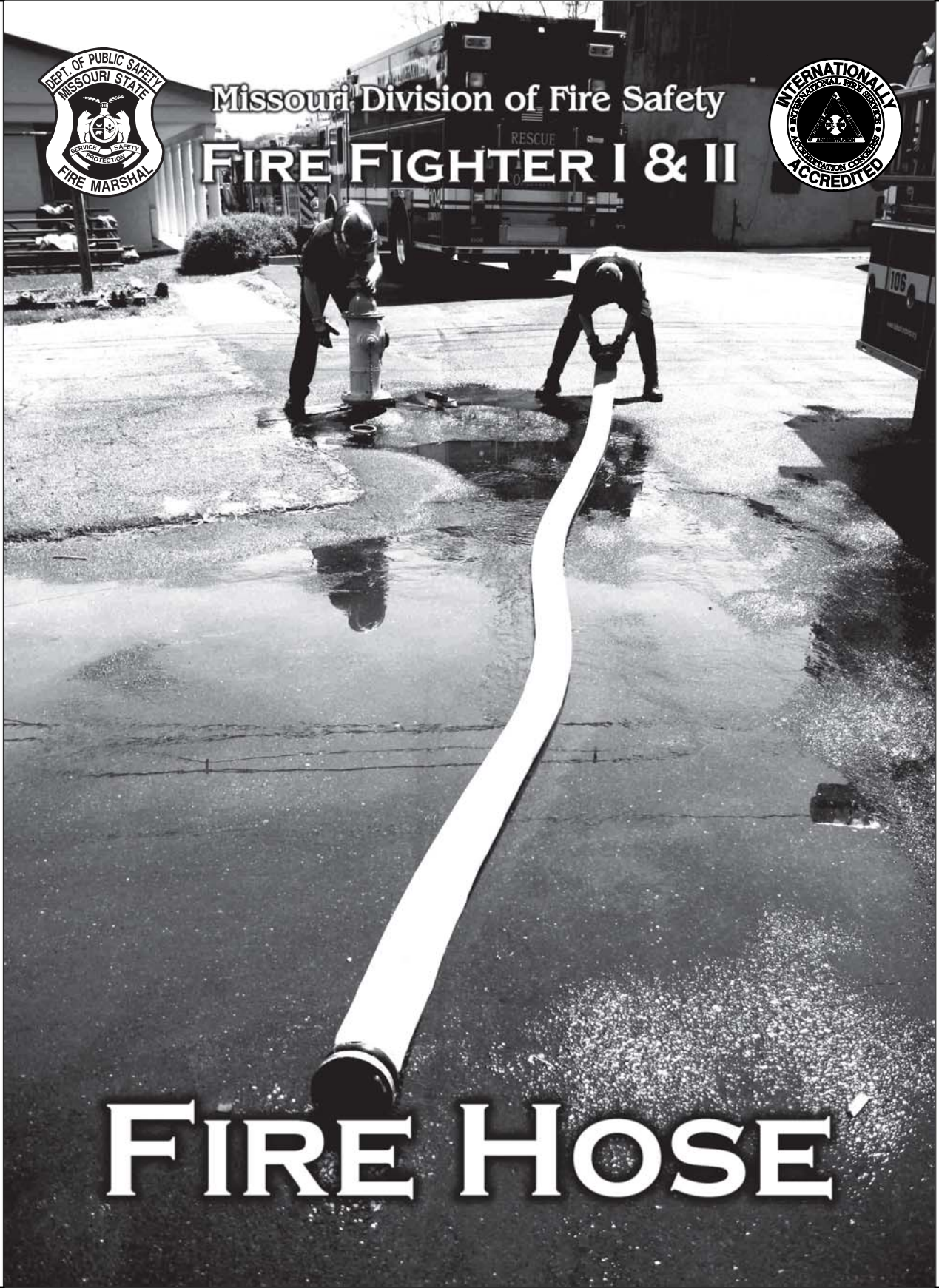




Missouri Division of Fire Safety
FIRE FIGHTER I & II



FIRE HOSE



UNIT OBJECTIVES

Upon completion of this unit of study, the student should be able to:

1. Identify the construction features of fire hose and the application of each size and type of fire hose.
2. Identify the construction features of fire hose couplings and identify parts and dimensions of selected hose couplings.
3. Demonstrate coupling and uncoupling procedures for two lengths of hose.
4. Identify procedures for basic hose loads.
5. Demonstrate three types of hose loads and finishes.
6. Demonstrate three hose rolls for hose.
7. Demonstrate two hose carries.
8. Demonstrate hose and hose coupling cleaning, maintenance, and inspection procedures.
9. Identify the four main causes of fire hose injuries.
10. Demonstrate procedures for replacing a burst section of hose using the kink or clamp method.
10. Demonstrate procedures for advancing an uncharged and charged attack lines operating as a member of a team.
11. Identify any nozzle and hose combination according to size and usage for fire attack for at least three different fire situations.
12. Identify appliance selection based on at least three specific fire ground situations.
13. Demonstrate procedures for conducting annual fire hose service test.



NFPA STANDARDS

Successful completion of the information in this section is necessary to fulfill the requirements of the following sections of NFPA 1001-2002:

Fire Fighter I Standard

5.3.10* Attack an interior structure fire operating as a member of a team, given an attack line, ladders when needed, personal protective equipment, tools, and an assignment, so that team integrity is maintained, the attack line is deployed for advancement, ladders are correctly placed when used, access is gained into the fire area, effective water application practices are used, the fire is approached correctly, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, the correct body posture is maintained, hazards are recognized and managed, and the fire is brought under control.

(A) Requisite Knowledge. Principles of fire streams; types, design, operation, nozzle pressure effects, and flow capabilities of nozzles; precautions to be followed when advancing hose lines to a fire; observable results that a fire stream has been properly applied; dangerous building conditions created by fire; principles of exposure protection; potential long-term consequences of exposure to products of combustion; physical states of matter in which fuels are found; common types of accidents or injuries and their causes; and the application of each size and type of attack line, the role of the backup team in fire attack situations, attack and control techniques for grade level and above and below grade levels, and exposing hidden fires.

(B) Requisite Skills. The ability to prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow and patterns; apply water using direct, indirect, and combination attacks; advance charged and uncharged 38 mm (1½ in.) diameter or larger hose lines up ladders and up and down interior and exterior stairways; extend hose lines; replace burst hose sections; operate charged hose lines of 38 mm (1½ in.) diameter or larger while secured to a ground ladder; couple and uncouple various handline connections; carry hose; attack fires at grade level and above and below grade levels; and locate and suppress interior wall and subfloor fires.

5.5.2* Clean, inspect, and return fire hose to service, given washing equipment, water, detergent, tools, and replacement gaskets, so that damage is noted and corrected, the hose is clean, and the equipment is placed in a ready state for service.

(A) Requisite Knowledge. Departmental procedures for noting a defective hose and removing it from service, cleaning methods, and hose rolls and loads.



NFPA STANDARDS

(B) Requisite Skills. The ability to clean different types of hose, operate hose washing and drying equipment, mark defective hose, and replace coupling gaskets, roll hose, and reload hose.

Fire Fighter II Standard

6.3.2* Coordinate an interior attack line for a team's accomplishment of an assignment in a structure fire, given attack lines, personnel, personal protective equipment, and tools, so that crew integrity is established; attack techniques are selected for the given level of the fire (e.g., attic, grade level, upper levels, or basement); attack techniques are communicated to the attack teams; constant team coordination is maintained; fire growth and development is continuously evaluated; search, rescue, and ventilation requirements are communicated or managed; hazards are reported to the attack teams; and incident command is apprised of changing conditions.

(A) Requisite Knowledge. Selection of the nozzle and hose for fire attack, given different fire situations; selection of adapters and appliances to be used for specific fireground situations; dangerous building conditions created by fire and fire suppression activities; indicators of building collapse; the effects of fire and fire suppression activities on wood, masonry (brick, block, stone), cast iron, steel, reinforced concrete, gypsum wallboard, glass, and plaster on lath; search and rescue and ventilation procedures; indicators of structural instability; suppression approaches and practices for various types of structural fires; and the association between specific tools and special forcible entry needs.

(B) Requisite Skills. The ability to assemble a team, choose attack techniques for various levels of a fire (e.g., attic, grade level, upper levels, or basement), evaluate and forecast a fire's growth and development, select tools for forcible entry, incorporate search and rescue procedures and ventilation procedures in the completion of the attack team efforts, and determine developing hazardous building or fire conditions.

6.5.5 Perform an annual service test on fire hose, given a pump, a marking device, pressure gauges, a timer, record sheets, and related equipment, so that procedures are followed, the condition of the hose is evaluated, any damaged hose is removed from service, and the results are recorded.

(A)* Requisite Knowledge. Procedures for safely conducting hose service testing, indicators that dictate any hose be removed from service, and recording procedures for hose test results.

(B) Requisite Skills. The ability to operate hose testing equipment and nozzles and to record results.



NOTES	STUDENT GUIDE
	<p>I. Fire Hose (<i>Essentials p. 631</i>)</p> <p>A. Fire hose is defined as a type of flexible tube which carries water under pressure from the source of supply to a point where it is discharged to extinguish fire</p> <ol style="list-style-type: none">1. How maneuverable the fire hose makes the fire fighter is greatly dependent upon his or her skill in using fire hose2. Not only is skill necessary, but safety also falls into play3. Fire hose is a very common source of fireground injuries <p>B. Basic uses</p> <ol style="list-style-type: none">1.2. <p>C. General features</p> <ol style="list-style-type: none">1. Flexible2. Watertight3. <p>D. Construction features</p> <ol style="list-style-type: none">1. Fire hose is commonly cut and coupled in sections of 50 or 100 feet2. Classified by size (inside diameter) and material used in construction



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">a. 2½" to 6" flexible, hard suction intake hose<ul style="list-style-type: none">(1)(2) Rubber covered, fabric and wire reinforced, and rubber lined(3) Designed to withstand the partial vacuum created when drafting without collapsingb. 4" to 6" woven-jacketed rubber lined intake hose: primarily used for connecting to hydrantsc. 1½" to 5" impregnated single-jacket, polymer covered, fabric reinforced, polymer lined<ul style="list-style-type: none">(1)(2) Larger sizes are typically used as supply linesd. 1½" to 6" woven-jacketed, rubber lined<ul style="list-style-type: none">(1) 1½" to 3" -(2) 4" to 6" -e. ¾" or 1" rubber-covered, rubber lined booster hose <p>3. Fibers used in construction of outer jacket</p> <ul style="list-style-type: none">a. Cottonb. Nylon



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">c. Rayond. Vinyle. Rubber <p>E. Causes of fire hose damage</p> <ul style="list-style-type: none">1. Mechanical - worn places, rips, and abrasions<ul style="list-style-type: none">a. Avoid laying or pulling hose over sharp or rough cornersb. Prevent vehicles from running over hosec.d.e. Provide chafing blocks to prevent abrasionsf. Avoid excessive pump pressures2. Thermal damage<ul style="list-style-type: none">a. Excessive heat can:<ul style="list-style-type: none">(1) Melt or weaken fabric coverings(2) Dry the rubber liningb.c. Do not leave in heated area after hose is dryd. Keep woven jacket dry when not in use



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">e. Run water through hose that has not been used for some time to keep the liner softf.g. Keep away from vehicle exhausth. Shield from sun with hose bed coversi. Roll dry hose in a straight roll for storage to keep the liner from drying out <p>3. Organic damage: mold and mildew</p> <ul style="list-style-type: none">a. Causes decay and deterioration of woven-jacket hoseb. Rubber-jacket hose is not subject to mold and mildew damagec. Remove all wet hose from apparatus and replace with dry hosed. Remove, inspect, sweep and reload hose which has not been unloaded from apparatus or used for six months <p>4. Chemical contact</p> <ul style="list-style-type: none">a. Chemicals and petroleum products can damage the outer jacket and rubber lining and weaken hoseb. If hose has contacted an acid, wash it with a solution of water and baking sodac. Test hose for possible damage that may have occurred



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">d.e. Dispose of hose contaminated by hazardous materials <p>F. Inspecting fire hose</p> <ul style="list-style-type: none">1. Check the expansion rings at both ends of the hose for burrs, looseness, or damage2. Check inner lining of hose at both hose couplings for signs of cracks, age, or defects3. Check outer hose jacket for signs of:<ul style="list-style-type: none">a. Mechanical damage such as cuts, abrasions, tears, dirt, or stressb.c.d.4. Checks for hose test date <p>G. Care and maintenance of hose</p> <ul style="list-style-type: none">1. Washing hose<ul style="list-style-type: none">a. Hard rubber and rubber-jacket hose can be cleaned with water and a mild detergentb. Woven-jacket hose <p>(1)</p>



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">(2) Wash with water and mild detergent(3) High-pressure power washers can cause the jacket to separate from the lining(4) Use a hose-washing machine, if available <p>2. Drying hose</p> <ul style="list-style-type: none">a. Air dry on rack or in a hose towerb. Commercial hose dryers are availablec. <p>3. Storing hose</p> <ul style="list-style-type: none">a. Hose should be stored rolled on hose racks in well-ventilated areasb. Stored hose should not be subjected to excessive exhaust fumes <p>II. Fire Hose Couplings (<i>Essentials p. 638</i>)</p> <ul style="list-style-type: none">A. Hose coupling are typically constructed of brass, aluminum, or magnesium alloysB. Construction techniques<ul style="list-style-type: none">1. Drop forged: strongest and heaviest2. Extruded3. Cast: weakest and rarely used for fire hose



NOTES	STUDENT GUIDE
	<p>C. Types of couplings</p> <p>1. Threaded couplings</p> <ul style="list-style-type: none">a. Male coupling has external threadsb. Female coupling has internal threadsc. Shank<ul style="list-style-type: none">(1)(2) Attached to the hose by being placed over the hose exterior and held in place by an expansion ring inside of the hosed. Lugs: assist in tightening and loosening connections<ul style="list-style-type: none">(1) Pins: not common with newer hose(2) Rocker: most common(3) Recessed: usually on booster hose(4)(5) Female coupling have lugs on the swivele. Higbee cut and indicator<ul style="list-style-type: none">(1) Higbee cut:(2) Higbee indicator: an indentation on the lugs marking where the Higbee cut begins



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">2. Storz couplings<ul style="list-style-type: none">a. "Sexless" coupling: neither male or female typesb. Couplings are identicalc. Connected or disconnected with a quarter turnd. Storz couplings on large diameter hose must have locking devices on them to comply with NFPA 1963D. Inspecting couplings<ul style="list-style-type: none">1. Check the male coupling for:<ul style="list-style-type: none">a.b.c. Tightness and proper mounting on hose2. Check female coupling swivel for:<ul style="list-style-type: none">a. Function and freedom of movementb. Shape and out-of-roundness damagec. Tightness and proper mounting on hose3.E. Care and maintenance of couplings<ul style="list-style-type: none">1. Avoid dropping or dragging couplings2. Do not permit vehicles to run over hose



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">3. Examine couplings when hose is washed and dried4.5. Use a brush to remove dirt and tar from threads <p>F. Coupling and uncoupling fire hose</p> <ul style="list-style-type: none">1. Coupling (hand tighten)<ul style="list-style-type: none">a. Foot tilt method<ul style="list-style-type: none">(1) Place one foot behind the male coupling(2) Apply pressure to tilt it upward(3) Bring the couplings together and turn the swivel completely onto the male end and align the flat sides of hose in same planeb. Over-the-hip method<ul style="list-style-type: none">(1) Bring female coupling over the hip(2) Attach the male coupling while holding the hose in place using the hipc. Knee-press method<ul style="list-style-type: none">(1) Stand male coupling on end(2) Place the female coupling onto the male and place a knee onto the hose above the female coupling(3) Keep thigh in vertical plane with coupling and apply body weight to connections



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">d. Two-fire fighter method<ul style="list-style-type: none">(1) One fire fighter holds the male coupling with both hands, bends the hose behind the coupling and presses it against the upper thigh(2) This fire fighter looks away to prevent trying to help align the couplings(3) The second fire fighter brings the female coupling to the male coupling and completes the connection2. Uncoupling<ul style="list-style-type: none">a. Knee-press method<ul style="list-style-type: none">(1) Stand male coupling on end(2) Place the female coupling onto the male and place a knee onto the hose above the female coupling(3) Keep thigh in vertical plane with coupling and apply body weight to connectionsb. Two-fire fighter stiff-arm method<ul style="list-style-type: none">(1) Both fire fighters hold each coupling and press toward the other(2) Keeping their arms stiff and using their weight, they turn each coupling to loosen the connection



NOTES	STUDENT GUIDE
	<p data-bbox="570 411 1227 443">III. Hose Appliances and Tools (<i>Essentials p. 643</i>)</p> <p data-bbox="618 489 886 520">A. Hose appliances</p> <ol data-bbox="667 569 1401 1780" style="list-style-type: none"><li data-bbox="667 569 691 600">1.<li data-bbox="667 642 805 674">2. Valves<ol data-bbox="716 720 1401 1780" style="list-style-type: none"><li data-bbox="716 720 1097 751">a. Control the flow of water<li data-bbox="716 793 1401 1014">b. Ball valves<ol data-bbox="764 867 1401 1014" style="list-style-type: none"><li data-bbox="764 867 1390 898">(1) Used in pumper discharges and gated wyes<li data-bbox="764 940 1352 1014">(2) Open when the handle is in line with the hose<li data-bbox="716 1056 1401 1287">c. Gate valves<ol data-bbox="764 1140 1401 1287" style="list-style-type: none"><li data-bbox="764 1140 1341 1171">(1) Used to control the flow from a hydrant<li data-bbox="764 1213 1401 1287">(2) Uses a baffle moved by a handle and screw arrangement<li data-bbox="716 1329 1401 1549">d. Butterfly valves<ol data-bbox="764 1413 1401 1549" style="list-style-type: none"><li data-bbox="764 1413 1211 1444">(1) Used on large pumper intakes<li data-bbox="764 1486 1401 1549">(2) Uses a flat baffle operated by a quarter-turn handle<li data-bbox="716 1591 1401 1780">e. Clapper valves<ol data-bbox="764 1675 1401 1780" style="list-style-type: none"><li data-bbox="764 1675 1187 1707">(1) Used in siamese appliances<li data-bbox="764 1749 1357 1780">(2) Allows water to flow only one direction



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">3. Valve appliances<ul style="list-style-type: none">a. Used to increase or decrease the number of hoselines operatingb. Gated wye appliances<ul style="list-style-type: none">(1)(2) Most common: 2½" female inlet to two male 1½" outlets(3) For large water volume operations, wyes are available with a LDH inlet and two male 2½" outletsc. Siamese appliances<ul style="list-style-type: none">(1)(2) Will have two or more female connections coming in and a male discharge exiting(3) Will have clapper valves to allow one hose to be attached without water flowing from the open connectionsd. Water thief appliances<ul style="list-style-type: none">(1)(2) Most often used in wildland fire operations(3) The most common wildland water thief has one 1½" inlet with 1½" outlet and one 1" outlet



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">e. Hydrant valves<ul style="list-style-type: none">(1) Allow a supply line to be connected to a hydrant and charged(2) Additional hoselines can be laid to the hydrant, a supply pumper connected to the hydrant and pressure boosted without interrupting flow to the first supply linef. Large-diameter hose appliances<ul style="list-style-type: none">(1) An operation may require that water be distributed at various points along a supply line(2) A LDH manifold appliance can be used to supply other lines from the main supply line(3) Also referred to as "portable hydrants," "phantom pumpers," or "large-diameter distributors" <p>4. Fittings</p> <ul style="list-style-type: none">a. Adaptors<ul style="list-style-type: none">(1) Used to connect hose couplings with the same size inside diameter and with similar threads(2) Double female:(3) Double male:(4) Sexless (Storz) coupling to threaded hydrant outlet



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">b. Reducers<ul style="list-style-type: none">(1) Used to reduce an outlet to a smaller size(2) Allows a smaller hose to be connected to a larger linec. Elbows: change the water flow directiond. Hose caps: to close off male couplingse. Hose plugs: to close off female couplings <p>5. Intake devices</p> <ul style="list-style-type: none">a. Suction hose strainers: attached to hard suction to prevent debris from entering the pumpb. Low-level strainers<ul style="list-style-type: none">(1) Used with portable water dump tanks(2) Allows water to be drafted from the tank when near the tank bottom <p>B. Hose tools: water does not flow through hose tools</p> <p>1. Hose roller</p> <ul style="list-style-type: none">a.b. Consists of metal frame with two or more rollersc. Can also be used to protect rope from similar edges



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">2. Hose jacket<ul style="list-style-type: none">a.b. Consists of a hinged two-piece metal cylinder with rubber liningc. Leather hose jacket: wrapped around the hose leak and buckled3. Hose clamp<ul style="list-style-type: none">a.<ul style="list-style-type: none">(1) Prevent charging hose in the hose bed during hose laying(2) Replacement of a burst section of hose without shutting down the water flow(3) Extend a hoseline without shutting down the water supply(4) Allow advancement of a charged line up stairsb. Types<ul style="list-style-type: none">(1) Screw-down(2) Press-down(3) Hydraulic pressc. Applying a hose clamp<ul style="list-style-type: none">(1) Apply at least 20 feet behind the apparatus



NOTES	STUDENT GUIDE
	<p>(2)</p> <p>(3) Center the hose evenly in the clamp jaws to avoid pinching the hose</p> <p>(4) Close and open the clamp slowly to avoid water hammer</p> <p>(5) Stand to one side when using a press-down clamp in case the handle suddenly snaps open</p> <p>4. Spanner wrenches</p> <ul style="list-style-type: none">a.b. As wedge for pryingc. Opening that fits gas utility valvesd. Flat surface for hammering <p>5. Hydrant wrenches</p> <ul style="list-style-type: none">a.b. Equipped with a pentagonal opening to fit most hydrant operating nutsc. May have a spanner to make or break connections <p>6. Rubber mallet: used to strike lugs on larger hose to tighten or loosen connections</p>



NOTES	STUDENT GUIDE
	<p>7. Hose bridge or ramp</p> <ul style="list-style-type: none">a.b. Can be used as chafing blocks <p>8. Chafing blocks</p> <ul style="list-style-type: none">a. Used to protect hose where it is subject to rubbing from vibrationsb. May be made of wood, leather, or rubberc. A hose roll can be placed under hose as a chafing block <p>9. Hose strap, hose rope, and hose chain</p> <ul style="list-style-type: none">a.b. Gives a secure means to handle pressurized linesc. Can be used to secure ladders to fixed objects <p>IV. Hose Rolls (<i>Essentials p. 653</i>)</p> <ul style="list-style-type: none">A. The method selected for rolling fire hose depends on whether it is to be used or stored but the couplings must always be protected from damageB.<ul style="list-style-type: none">1. Used for:<ul style="list-style-type: none">a.



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">b.c. Carrying hose to quarters for washing <p>2. Start rolling the hose at male end to protect threads and roll hose from male end to female</p> <ul style="list-style-type: none">a. Lay out the hose straight and flat on a clean surfaceb. Roll the male coupling over onto the hose to startc. Continue rolling the coupling over onto the hose to form an even rolld. Lay the completed roll on the ground and tamp any coils down into the roll with a foot <p>C.</p> <p>1. For situations when hose is going to be deployed from the roll for use</p> <ul style="list-style-type: none">a.b.c. Hose is less likely to spiral when unrolled <p>2. Rolling method one</p> <ul style="list-style-type: none">a. Lay the hose in straight lineb. Start the roll about five feet off center closer to male coupling



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">c. Roll toward the female end, leaving sufficient space at the center loop to insert a hand for carryingd. Extend the short length of hose at the female end over the male threads to protect theme. The couplings should be within about 12-inches of each other <p>D. Twin Donut Roll</p> <ul style="list-style-type: none">1. A compact roll transportable for special application, such as high-rise situations2.3. Rolling the twin donut<ul style="list-style-type: none">a. Place the male and female couplings together and lay the hose flat forming two parallel linesb. Fold the loop end over and on to the two linesc. Roll both lines simultaneously toward the couplings <p>E. Self-locking twin donut roll: same features as twin donut but hose is secured together and transported using a portion of the hose itself</p> <p>F. High-rise packs: usually several lengths of 1¹/₂" or 1³/₄" hose plus selected tools and appliances</p>



NOTES	STUDENT GUIDE
	<p>V. Hose Loads (<i>Essentials p. 655</i>)</p> <p>A. Terminology</p> <ol style="list-style-type: none">1. Hose bed: the hose compartment on fire apparatus<ol style="list-style-type: none">a. Front:b. Rear:c. May be divided to hold two or more separate hose loads, "split bed"2. Finishes: arrangements of hose usually placed on top of a hose load and connected to the end of the load3. "Dutchman"<ol style="list-style-type: none">a. A short fold or reverse bend in a hose loadb. <p>B. Hose loading guidelines</p> <ol style="list-style-type: none">1.2. Keep flat sides in same plane (lug position is not important)3. Hand tighten couplings4. Do not use spanners to tighten couplings5. Remove kinks and twists when forming a loop in the hose bed



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">6. Use “dutchmen” where necessary<ul style="list-style-type: none">a. So couplings are not too close to the front or rear of the hose bedb. So the hose will not flip over when pulled7. Do not pack hose too tightly<ul style="list-style-type: none">a. Puts excess pressure on the hoseb. Can cause coupling to snag when pulled outc. It should be loose enough to place a gloved hand between the folds8. Load large-diameter hose with couplings near the hose bed front to save space and allow the hose to lie flat <p>C.</p> <ul style="list-style-type: none">1.2. Hose sets on edge3. Places bends at each end of hose bed4. All flakes are about the same length5. Making the accordion load<ul style="list-style-type: none">a. Lay the first section of hose in the bed on edge against the bed or partition sideb. Fold the hose at the front of the bed and back on itself



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">c. Lay the hose back to the rear next to the first lengthd. Continue laying lengths of the hose to the front and back to the reare. Stagger the bends at the rear edge about two-inches between foldsf. First fold of second tier directly over last fold of first tierg. Continue the second tier in the same manner as the first <p>D.</p> <ul style="list-style-type: none">1.2. Hose is loaded on edge around the perimeter of the hose bed in a "U" shape3. Each length is laid from the outside toward the inside4. When used in a wide hose bed, hose typically comes out in a wavy or snakelike lay on the ground, resulting in an inefficient lay5. Folds for a shoulder carry cannot be pulled as easily as with an accordion load6. Doesn't work for large-diameter hose7. Making the horseshoe load<ul style="list-style-type: none">a. Place the female coupling in a front corner of the bed



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">b. Lay the first length along the bed wallc. Make the first fold even with the rear of the bedd. Bring the hose back to the front of the bed and place it along the outer perimeter of the bed to the opposite sidee. Make a fold at the end and lay the next length along the perimeter inside of the first lengthf. Continue placing additional lengths along the inside of the preceding lengthsg. Start the second tier by extending the last fold over to a front corner of the bed and on top of the first tier <p>E.</p> <ul style="list-style-type: none">1.2. Hose is less subject to wear by vibration3. Hose fold have sharp bends so the hose should be reloaded periodically to change bend locations and prevent lining damage4. Better suited for LDH than accordion or horseshoe loads5. Loading the flatload<ul style="list-style-type: none">a. Lay the first length flat along the side of the bed or partitionb. Fold the hose back on itself at the front and lay it back to the rear on top of the first length



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">c. Fold the hose at the reard. Lay the next length back to the front, angling it to the side of the first length for the next lengthe. Continue placing the hose in the same manner across the bedf. Start the second layer in the same methodg. With LDH, a hose wringer or roller can be used to expel air and water from the hose as its loaded <p>F. Hose load finishes</p> <ul style="list-style-type: none">1. Hose load finishes are loaded to provide enough hose for a hydrant connection or a working line at a scene<ul style="list-style-type: none">a. Finishes for forward lays (straight lay) are not as elaborate as finishes for reverse laysb. Reverse lay finishes are designed to provide hose at the scene for initial fire attack2. Straight finish<ul style="list-style-type: none">a. Last length or two flaked loosely on top of hose loadb.c. Hydrant wrench, gate valve and necessary adaptors should be strapped to hose near female coupling



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">3. Reverse-horseshoe load finish<ul style="list-style-type: none">a. Similar to the horseshoe load except the bottom of the "U" portion of the horseshoe is at the rear of the hose bedb. Usually made of one or two 100-foot lengths of 2½" or 3" hose with a wye connecting two 1½" or 1¾" attack lines with nozzles attachedc. Large loop is at rear of hose bed to aid in advancement4. Skid load finish<ul style="list-style-type: none">a. Consists of folding the last three lengths of 2½" or 3" hose into a compact bundle on top of the hose loadb. Three or more pull loops are extended beyond the end of the hose bedc. The rest of the hose with the nozzle attached is accordion folded across the pull loop hosed. The hose pull loops can be pulled from the hose bed, dropping the entire skid on the ground and then the nozzle pulled toward the fire <p>G. Preconnected hose loads</p> <ul style="list-style-type: none">1.2. Connected to a pump discharge and a nozzle pre-connected for quick deployment



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">3. Can be carried on apparatus in:<ul style="list-style-type: none">a. Longitudinal beds: divided hose beds with supply lines on one side and preconnected lines on the otherb. Raised traysc. Transverse beds: referred to as "crosslays"d. Tailboard compartmentse. Side compartments or binsf. Front bumper wells (sometimes called "jump lines")g. Reels4. Preconnected flatload<ul style="list-style-type: none">a.b. Often used as crosslaysc. Loops are placed at regular intervals within the load for pulling from the bedd. Loading a preconnected flatload<ul style="list-style-type: none">(1) Attach the female coupling to the discharge outlet(2) Lay the first length of hose flat in the bed against the sidewall(3) Angle the hose to lay the next fold adjacent to the first fold and continue building the first tier



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">(4) Make a fold that extend about 8 inches beyond the bed at a point about one-third the total length of the load (serves as a pull handle)(5) Continue laying the hose building each tier across the bed(6) Make a fold that extends about 14 inches beyond the load at a point about two-thirds the total length of the bed for a pull handle(7) Complete the load and attach the nozzle and play it on top of the load <p>5.</p> <ul style="list-style-type: none">a. The hose is folding in three layers outside of the bedb. The three folds are placed in the bed in an "S" shaped fashionc.d. The entire load must be pulled from the bed before usede. Loading a triple layer load<ul style="list-style-type: none">(1) Start the load with sections of hose connected and the nozzle attached(2) Connect the female coupling to the discharge(3) Extend the hose in a straight line from the hose compartment



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">(4) Pick up the hose at a point two-thirds of the distance from the apparatus to the nozzle(5) Carry this hose to the truck(6) Using several fire fighters, pickup the entire length of the three layers(7) Begin laying the hose in to the bed by folding over the three layers into the hose bed(8) Fold the layers over the front of the bed(9) Continue to lay the hose into the bed in an "S" shaped configuration until the entire length is loaded(10) Optional: Secure the nozzle to the first set of loops using a rope or strap <p>6.</p> <ul style="list-style-type: none">a.b. The load is carried on the shoulder and plays off of the topc. Can be awkward when wearing SCBAd. If load is in a single stack, it may collapse on the shoulder if not held tightly <p>7. Booster hose reels</p> <ul style="list-style-type: none">a. Rubber-covered hose carried preconnected and coiled on reels



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">b. Booster lines have a maximum output of 40 gpmc. Should never be used for interior fire attackd. Should only be used for low-intensity fires and mop-up <p>VI. Supply Hose Lays (<i>Essentials p. 664</i>)</p> <ul style="list-style-type: none">A. Hose lay procedures vary with department and depend on local conditions<ul style="list-style-type: none">1. Hose may be laid forward from a water source to the incident scene2. Hose may be laid reverse from the incident scene to the water source3. Hose beds may be split so hose can be laid to or from the incident scene to the water sourceB. Basic hose laying procedures<ul style="list-style-type: none">1.2. When laying hose, the apparatus should travel no faster than 5 to 10 mph to allow the coupling to clear the tailboard as the hose leaves the hose bed3. Hose should be laid to one side of a roadway but not in the gutterC.<ul style="list-style-type: none">1.



NOTES	STUDENT GUIDE
	<ol style="list-style-type: none">2. Often used when hydrants are available and the pumper must be at scene3. For forward lays, the first coupling to come off the hose bed is female4. Advantages<ol style="list-style-type: none">a. The apparatus is at the scene so its hose, tools, and equipment are availableb. The pump operator has visual contact with suppression operations5. Disadvantages<ol style="list-style-type: none">a. One member of the crew is temporarily unavailable by staying at the hydrant long enough to connect the hose and open the hydrantb. A second may be needed to boost the flow pressure if a long lay of 2½" or 3" hose is necessary or the hydrant has inadequate pressure6. Using four-way hydrant valves<ol style="list-style-type: none">a. A four-way hydrant valve allows for a forward-laid supply line to be charged and another pumper to connect to the hydrantb. The second pumper can supply additional supply lines or boost the pressure to the original linec. Some departments preconnect the hydrant valve to the end of the supply line in the hose bed



NOTES	STUDENT GUIDE
	<p>7. Connecting to a hydrant for a forward lay</p> <ul style="list-style-type: none">a. The fire fighter assigned to make the hydrant connection should have:<ul style="list-style-type: none">(1) A combination spanner/hydrant wrench(2) A hydrant valve (if part of local procedures)(3) A portable radio for contact with the pumperb. The pumper stops at the hydrant and the fire fighter dismounts and goes to the tailboard of the apparatusc. Enough hose is grabbed to reach the hydrantd. The fire fighter steps off the tailboard with the hose and needed equipmente. The hose is looped around the hydrant and the driver is signaled to proceed to the scenef. A cap is removed from the hydrant and the hydrant wrench placed on the stem operating nutg. When enough hose has played from the apparatus hose bed, the hose is unwrapped from the hydranth. The hose is connected to the open outlet (a hydrant valve should be attached to the outlet if local procedures dictate)i. When signaled, the hydrant is fully opened



NOTES	STUDENT GUIDE
	<p data-bbox="618 411 651 443">D.</p> <ol data-bbox="667 489 1398 1854" style="list-style-type: none"><li data-bbox="667 489 691 520">1.<ol data-bbox="716 562 1398 783" style="list-style-type: none"><li data-bbox="716 562 1398 674">a. Allows a pumper to go to the fire and then lay a supply line to a water source for drafting operations or to boost hydrant pressure<li data-bbox="716 716 1398 783">b. Hose is loaded so the male coupling comes off the bed first<li data-bbox="667 831 1336 863">2. Used when setting up relay pumping operations<li data-bbox="667 909 1377 1052">3. The biggest disadvantage is that all needed fire equipment and attack hose must be unloaded at the scene before the pumper proceeds to the water source<li data-bbox="667 1098 1398 1514">4. Attack pumper and water supply pumper operations<ol data-bbox="716 1171 1398 1514" style="list-style-type: none"><li data-bbox="716 1171 1398 1283">a. The first-arriving pumper goes directly to the scene to start the initial attack using water from its tank<li data-bbox="716 1329 1398 1396">b. A second pumper lays hose from the attack pumper to the water source<li data-bbox="716 1442 1398 1514">b. The second pumper then relays water to the attack pumper at the scene<li data-bbox="667 1560 1024 1591">5. Reverse lay procedures<ol data-bbox="716 1633 1398 1854" style="list-style-type: none"><li data-bbox="716 1633 1398 1703">a. Sufficient hose is pulled to reach the intake valve on the attack pumper<li data-bbox="716 1749 1398 1854">b. The hose is anchored under the wheel on the attack pumper as the supply pumper proceeds to the water supply



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">c. A hose clamp is applied to the hose at the attack pumperd. The hose is then connected to the attack pumper intakee. After the supply pumper stops at the water source, an intake hose is connected to the sourcef. The remaining length of the last section of hose laid is pulled from the hose bed and connected to a discharge on the supply pumper <p>6. Making hydrant connection with soft intake hose</p> <ul style="list-style-type: none">a. Fire fighters may have to assist pumper operators with making hydrant connections following a reverse layb. Hard intake which is marked "For Vacuum Use Only" should not be used for hydrant connectionsc. Making hydrant connections with hard intake hose is much more difficult than with soft intake hosed. The first point in making these connections is that the pumper must be positioned properly for the length of hose to be used <p>F. Split lay</p> <ul style="list-style-type: none">1.



NOTES	STUDENT GUIDE
	<p>2. In one type of split lay, hose is laid in part as a forward lay and in part as a reverse lay</p> <ul style="list-style-type: none">a. One pumper makes a forward lay from an intersection or driveway entranceb. A second pumper makes a reverse lay from the initial line to the water sourcec. With sexless couplings the direction of the lay is unimportantd. With threaded coupling, personnel must be sure they have the appropriate adapters to make the needed connections <p>VII. Handling Hoselines (<i>Essentials p. 671</i>)</p> <p>A. Handling preconnected hoselines</p> <ul style="list-style-type: none">1. The method to pull preconnected hoselines varies with the type of hose load2. Advance the preconnected flat hose load<ul style="list-style-type: none">a. One arm is placed through the longer loopb. The shorter is grasped with the same handc. The nozzle is grasped with the other handd. The load is pulled from the bed using the loopse. The fire fighter walks toward the fire until the hose is fully extended



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">3. Advancing the triple layer hose load<ul style="list-style-type: none">a. The nozzle and fold of the first tier is placed over the shoulderb. The fire fighter walks away from the apparatus, pulling the hose completely out of the bedc. The folded end is dropped when the hose has cleared the bedd. The nozzle is then advanced until the line has been fully extendedB. Handling 2½" or 3" hose that is not preconnected<ul style="list-style-type: none">1.<ul style="list-style-type: none">a. Face the hose bedb. Grasp nozzle or couplingc. Use both hands to grasp the number of folds of hose needed to make up that portion of the shoulder loadd. Pull the folds about one-third out of the bede. Turn and pivot into the folds, placing them on the shoulderf. Make sure the hose is flat on the shoulder and the nozzle or coupling in frontg. Hold the bundle tightlyh. Step away from the apparatus, pulling the shoulder out of the bed



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">2.<ul style="list-style-type: none">a. Stand next to the hose at a coupling or nozzle, facing the direction of travelb. Place the hose over the shoulder with the coupling or nozzle in frontc. Hold the coupling or nozzle and pull with the shoulderd. Position other fire fighters at each coupling to assist in advancing the hoseC. Single section drain and carry<ul style="list-style-type: none">1.2. Hose should be in a straight line, no bends, before starting3. Procedure<ul style="list-style-type: none">a. Pick up one end and allow water to flow forwardb. Place the coupling in front of body with hose looped over shoulderc. Walk down the hose, placing loops on shoulder



NOTES	STUDENT GUIDE
	<p>VIII. Advancing Hoselines (<i>Essentials p. 672</i>)</p> <p>A. Hoselines are easier to deploy before charged because water adds weight and pressure stiffens the hose</p> <ol style="list-style-type: none">1.2. Fire personnel must be able to work with both charged and uncharged lines <p>B. Advancing a hose into a structure</p> <ol style="list-style-type: none">1.2. The fire fighter on the line just behind the nozzle operator should be close enough to help relieve hose pressure from the operator3. Other fire fighters on the line should be spaced apart to help maneuver the hoseline4. Feel door for heat before opening5.6. Set nozzle pattern for desired configuration7.8. Block doors open to prevent the hose from being pinched by the door9. Always check for and remove kinks from the line



NOTES	STUDENT GUIDE
	<p>C. Advancing a hoseline up a stairway</p> <ol style="list-style-type: none">1. Uncharged line<ol style="list-style-type: none">a.b. The shoulder carry can be used because the hose can be fed out as the stairs are climbedc. Position personnel about 15 feet apart and facing the nozzle for shouldering the lined. Fire fighters place hose bundles on their shoulders to advancee. After their shoulder loads have played out, the last fire fighters on the line should position themselves along the stairs to help feed the hosef. The hoseline should be advanced up the stairs against the outside wall avoiding sharp bends and kinksg. Excess hose should be flaked up the stairs to the floor above the fire to make advancing on the fire floor easier2. Charged hoseline<ol style="list-style-type: none">a. Advance the line using the working line dragb. Position fire fighters along the route to help feed the hose and keep it on the outside of the staircasec. Advance up the stairs against the outside wall, maintaining spacing between personnel



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">d. Make a large loop of hose on the floor above the fire floor for excessive line before advancemente. Advance the hose down the stairs to the fire floor using the working line drag <p>D. Advancing a hoseline down a stairway</p> <ul style="list-style-type: none">1. Uncharged line<ul style="list-style-type: none">a. Should only be done when there is no fire or a minor fire presentb. Position personnel about 25 feet apart and facing the nozzle for shouldering the linec. Fire fighters place hose bundles on their shoulders to advanced. After their shoulder loads have played out, the last fire fighters on the line should position themselves along the stairs to help feed the hosee. The hoseline should be advanced down the stairs against the outside wall avoiding sharp bends and kinks2. Charged line<ul style="list-style-type: none">a.b. Position fire fighters along the route to help feed the hose and keep it on the outside of the stair-casec. Advance down the stairs against the outside wall, maintaining spacing between personnel



NOTES	STUDENT GUIDE
	<p>E. Advancing a hoseline from a standpipe</p> <ol style="list-style-type: none">1. Preconnected hoselines may be able to reach the lower floors of high-rise building but other techniques are needed for higher floors2. Many fire departments prepare high-rise packs or high-rise hose bundles to be carried to up to fire floors3. Normally hose is connected to a standpipe one floor below the fire floor<ol style="list-style-type: none">a. The standpipe connection is usually in or near the stairwellb. If in an enclosed stairwell, the hose may be hooked to the standpipe on the fire floorc. At the standpipe connection, remove the outlet cap and check for foreign objects in the discharged. Connect the hose to the standpipe outlete. If 1½" or 1¾" hose in used, a gated wye should be placed on the standpipe outletf. Any extra hose should be flaked up the stairs toward the floor above <p>F. Advancing a hose up a ladder</p> <ol style="list-style-type: none">1. Uncharged line<ol style="list-style-type: none">a.



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">b. The lead fire fighter drapes the nozzle over the shoulder from the front on the side which the hose is being carriedc. The other fire fighters drape the hose over their shoulder on the same sided. The fire fighters climb the ladder, limiting one fire fighter per fly section <p>2. Charged line</p> <ul style="list-style-type: none">a. Position fire fighters on a ladder within reach of each other with each secured to the ladderb. Each fire fighter must be secured to the ladder with a leg lock or ladder beltc. Fire fighters on the ground extend the charged hose up to the fire fighter lowest on the ladderd. The hose is then pushed from fire fighter to fire fighter <p>3. If necessary to operate a hoseline from a ladder:</p> <ul style="list-style-type: none">a. The charged line is passed up the ladder according to procedureb. The hose is secured to the ladder with a hose strap several rungs below where the nozzle operator is standingc. All personnel on the ladder must be secured to the ladderd. The fire fighter at the nozzle, projects it through the ladder and secured it to the ladder with a strap



NOTES	STUDENT GUIDE
	<p>e.</p> <p>G. Extending a hoseline</p> <ol style="list-style-type: none">1. Bring an additional section(s) of hose to the nozzle2. Apply a hose clamp correctly at approximately five feet behind nozzle and open nozzle3. Remove the nozzle and attach the new line4. Stretch the line out and reattach the nozzle5. Slowly release the hose clamp <p>H. Replacing a burst section</p> <ol style="list-style-type: none">1.2. Apply a hose clamp approximately five feet behind coupling of damaged section3. Remove the burst section4. Replace one defective section with two additional lengths5. Flake hose out avoiding kinks6. Slowly release the hose clamp <p>I. Retrieving a loose hoseline</p> <ol style="list-style-type: none">1. Can be a very dangerous situation because of the whipping of a pressurized hoseline



NOTES	STUDENT GUIDE
	<ol style="list-style-type: none">2. It may be necessary to control the line before it can be shut down<ol style="list-style-type: none">a. The fire fighter must be in full protective gear with the faceshield loweredb. The fire fighter then kneels onto the hose about 30 to 40 feet from the uncontrolled end of the linec. Moving cautiously, the fire fighter crawls toward the uncontrolled endd. The end is pinned to the ground to control it until the line can be shut down3. Closing the valve at the pumper or hydrant is the safest solution4. Use a hose clamp at a stationary point on the line5. Kink the hose away from the break<ol style="list-style-type: none">a. Form a loop in the line by bending the line over itselfb. Apply body weight to the bend to kink the hose and stop the flow of water



NOTES	STUDENT GUIDE
	<p>IX. Operating Hoselines (<i>Essentials p. 678</i>)</p> <ul style="list-style-type: none">A. Fire fighters must be proficient in operating hoselines safely and effectivelyB. Operating small handlines: 1½", 1¾", 2"<ul style="list-style-type: none">1. One-fire fighter method<ul style="list-style-type: none">a.b. If one fire fighter is operating a small hoseline, the hoseline should be straight behind the nozzle for at least 10 feetc. The fire fighter should hold the nozzle with one hand and the hose with the otherd. When standing, the hose is cradled against the inside of the closest leg or hold it against the hipe. A foot is placed on the hose to anchor it in place2. Two-fire fighter method<ul style="list-style-type: none">a.b. The fire fighter at the nozzle holds it with one hand with the other hand on the hose behind the nozzlec. The backup fire fighter stands on the same side of the hose about three feet behind the nozzle operator



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">d. The second fire fighter holds the hose with both hands and rests it against the hip or braces it with a lege.f. The backup fire fighter's job is to keep the hose straight and take some of the pressure off of the nozzle operator <p>C. Operating 2½" and larger fire streams</p> <ul style="list-style-type: none">1. One-fire fighter unaided with high-pressure loop<ul style="list-style-type: none">a. A large loop is formed with the hose behind the nozzleb. The loop is crossed over the line about two feet behind the nozzlec.2. Two-fire fighter method<ul style="list-style-type: none">a. Grounding<ul style="list-style-type: none">(1) The nozzle operator holds the nozzle and rests the line against the waist and across the hip(2) The backup fire fighter holds the hose with both hands and places one knee on the hose about three feet behind the nozzle operator



NOTES	STUDENT GUIDE
	<ul style="list-style-type: none">b. Rope hose tools<ul style="list-style-type: none">(1) The nozzle operator places a rope hose tool or strap just behind the nozzle and places a large loop behind the back and over the outside shoulder(2) The rope hose tool is wrapped on the line behind the nozzle operator(3) The backup fire fighter also uses a rope hose tool about three feet behind the nozzle operator3. Three-fire fighter method<ul style="list-style-type: none">a. The nozzle operator is in the same position as with the two-person methodb. Some departments prefer the first back up fire fighter to be directly behind the nozzle operator<ul style="list-style-type: none">(1) This allows the back up fire fighter to relieve some of the back pressure from the nozzle operator(2) The third fire fighter kneeling on the hose behind the second fire fighterc. Another method is for all three to use hose straps and remain standing, making them more mobile



NOTES	STUDENT GUIDE
	<p>X. Hose Service Testing (<i>Essentials p. 680</i>)</p> <p>A. Fire hose testing</p> <ol style="list-style-type: none">1. Acceptance testing (proof testing)<ol style="list-style-type: none">a. Preservice tests performed at the factory or after delivery to assure it meets specificationsb. Done at pressures higher than anticipated in the field2. Service testing<ol style="list-style-type: none">a.b. Should be tested if hose has been damaged before placed back into service <p>B. Pressurized hose during testing is potentially dangerous</p> <ol style="list-style-type: none">1. In April, 2000, a Georgia fire chief died from a head injury suffered when a coupling separated from a hose jacket during hose service testing2. <p>C. The site for hose testing should be:</p> <ol style="list-style-type: none">1. Large enough to lay out straight runs of the hose2. Smooth and free of dirt and debris3. Near a water source for filling the hose



NOTES	STUDENT GUIDE
	<p data-bbox="618 411 906 443">D. Testing equipment</p> <ol data-bbox="667 489 1393 1014" style="list-style-type: none"><li data-bbox="667 489 1133 520">1. Hose testing machine or pumper<li data-bbox="667 562 1393 709">2. Hose test gate valve: a specially designed hose test gate valve with a one-quarter inch hole in the gate which permits the hose to be pressurized but not surge if the hose fails should be used<li data-bbox="667 751 943 783">3. Hose test records<li data-bbox="667 825 1247 856">4. Tags or means to identify failed sections<li data-bbox="667 898 1084 930">5. Nozzles with shut off valves<li data-bbox="667 972 967 1003">6. Marking equipment <p data-bbox="618 1056 919 1087">E. Testing procedures</p> <ol data-bbox="667 1134 1393 1896" style="list-style-type: none"><li data-bbox="667 1134 1141 1165">1. Keep a written record of the test<li data-bbox="667 1207 1393 1276">2. Visually inspect the hose for damage and all gaskets before testing<li data-bbox="667 1329 691 1360">3.<li data-bbox="667 1476 691 1507">4.<li data-bbox="667 1633 1222 1665">5. Each lay must have a nozzle on the end<li data-bbox="667 1707 1393 1776">6. Pressure is slowly raised as the lines are filled and the air bled from each line<li data-bbox="667 1818 1393 1887">7. The pressure is reduced and the lines shut down to check for leaks and the couplings are tightened



NOTES	STUDENT GUIDE
	<p>8. The pressure is again increased for the test</p> <ul style="list-style-type: none">a. Hose should be tested to the testing pressure recommended by the manufacturer which is normally printed on the hoseb. <p>9.</p> <p>10. After the allotted time, the pressure is slowly decreased and the lines emptied</p> <p>11. All hoses should then be checked for slipped couplings</p> <p>12. All defective hoses must be marked for repairs</p> <p>XI. Fire Hose Summary</p> <ul style="list-style-type: none">A. Fire fighters must be familiar with the construction and various uses of fire hose to properly care and maintain itB. Properly being able to safely handle fire hose is important to a fire fighter's basic responsibility of controlling and extinguishing firesC. Improperly used, fire hose can be dangerous to both fire personnel and the public and damage property beyond what a fire has done