NFPA 1410
Standard on Training for Initial Fire Attack

1995 Edition

National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

IMPORTANT NOTICE ABOUT THIS DOCUMENT

NFPA codes, standards, recommended practices, and guides, of which the document contained herein is one, are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in its codes and standards.

The NFPA disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making this document available, the NFPA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the NFPA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the NFPA list, certify, test or inspect products, designs, or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the NFPA and is solely the responsibility of the certifier or maker of the statement.

NOTICES

All questions or other communications relating to this document and all requests for information on NFPA procedures governing its codes and standards development process, including information on the procedures for requesting Formal Interpretations, for proposing Tentative Interim Amendments, and for proposing revisions to NFPA documents during regular revision cycles, should be sent to NFPA headquarters, addressed to the attention of the Secretary, Standards Council, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

Users of this document should be aware that this document may be amended from time to time through the issuance of Tentative Interim Amendments, and that an official NFPA document at any point in time consists of the current edition of the document together with any Tentative Interim Amendments then in effect. In order to determine whether this document is the current edition and whether it has been amended through the issuance of Tentative Interim Amendments, consult appropriate NFPA publications such as the *National Fire Codes*® Subscription Service, visit the NFPA website at www.nfpa.org, or contact the NFPA at the address listed above.

A statement, written or oral, that is not processed in accordance with Section 5 of the Regulations Governing Committee Projects shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

The NFPA does not take any position with respect to the validity of any patent rights asserted in connection with any items which are mentioned in or are the subject of this document, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on this document. Users of this document are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Users of this document should consult applicable federal, state, and local laws and regulations. NFPA does not, by the publication of this document, intend to urge action that is not in compliance with applicable laws, and this document may not be construed as doing so.

NFPA 1410

Standard on

Training for Initial Fire Attack

1995 Edition

This edition of NFPA 1410, *Standard on Training for Initial Fire Attack*, was prepared by the Technical Committee on Fire Service Training and acted on by the National Fire Protection Association, Inc., at its Fall Meeting held November 14-16, 1994, in Toronto, Ontario, Canada. It was issued by the Standards Council on January 13, 1995, with an effective date of February 7, 1995, and supersedes all previous editions.

The 1995 edition of this document has been approved by the American National Standards Institute.

Origin and Development of NFPA 1410

The first edition of this training standard on Initial Fire Attack was officially adopted as NFPA Standard Number 197 at the 1966 NFPA Annual Meeting held in Chicago, Illinois, May 16-20. It was prepared by the Committee on Fire Service Training and was tentatively adopted at the 1964 Annual Meeting.

The 1966 edition was revised in 1979.

This 1995 edition includes the results of comprehensive and extensive field tests to validate the recommended maximum times for fireground evolutions in Appendix A.

In their deliberations, the committee did not choose the "best" time, but chose times it felt are easily achieved by the appropriate effort of organization and training.

Technical Committee on Fire Service Training

John Hoglund, *Chair*
University of MD, MD

William E. Peterson, *Vice Chair*
Plano Fire Dept., TX
Rep. Fire Marshals Assn. of North America

Roger Bassett, Roselle, IL
Edward W. Bent, Sacramento, CA
Thomas E. Brown, DeKalb Cnty Public Safety, GA
Rep. Int'l Assn. of Fire Chiefs
Michael L. Calhoun, DeKalb Cnty Public Safety, GA
Ronald L. Callahan, Speedway, IN
Rep. Indianapolis Fire Dept.
Gene P. Carlson, OK State University, OK
Rep. Int'l Fire Service Training Assn.
Harry R. Carter, Newark Fire Dept., NJ
W. Rolland Connelly, Burlington, NJ
John Lee Cook, Denton Fire Dept., TX
Rep. NFPA Fire Service Section
Nicholas J. Cricenti, Cowan & Cricenti Engr Assoc., Inc., NH
Vincent K. Elmore, Palm Beach Fire Dept., FL
David C. Grupp, Kemper Nat'l Insurance Cos, IL
P. Gerald Haag, Cyntex (USA) Inc., CA
James G. Kellam, Virginia Beach Fire Dept., VA
Rep. Int'l Society of Fire Service Instructors
Mark R. Layton, AAI Corp., MD
Robert A. Lincoln, Nassau Cnty Fire Service Academy, NY
John B. Lockwood, Bowie, MD
John M. Loverin, Lawrence Livermore Nat'l Laboratory, CA
George E. Luther, CT State Fire Admin., CT
Charles L. Page, TX A&M University System, TX
Thomas C. Quillin, Tallahassee Fire Dept., FL
James B. Straseske, IL Fire Service Inst., IL

Alternates

Robert F. Burger, Fire Pro, Inc., NM
(Alt. to E. Bent)
Doyle E. Frazier, Palm Beach Fire-Rescue Dept., FL
(Alt. to V. K. Elmore)
Carl Goodson, Fire Protection Publications, OK
(Alt. to G. P. Carlson)
Jack K. McElfish, Clayton Cnty Fire Dept., GA
(Alt. to T. Brown)

L. Charles Smeby, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in membership may have occurred. A key to classifications is found at the back of this document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on all fire service training techniques, operations, and procedures to develop maximum efficiency and proper utilization of available personnel. Such activities include training guides for fire prevention, fire suppression, and other missions for which the fire service has responsibility.

Contents

NFPA 1410

Standard on

NFPA 1410 Standard on Training for Initial Fire Attack

1995 Edition

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Appendix A.

Information on referenced publications can be found in Chapter 7

Chapter 1 Administration

1-1 Scope.

1-1.1* This standard contains minimum requirements for the evaluation of prior training in initial fire flow delivery procedures by fire department personnel engaged in structural fire fighting operations.

1-1.2 This standard specifies basic evolutions that can be adapted to local conditions and serves as a standard mechanism for the evaluation of minimum acceptable performance for hose line and water supply activities during training for initial fire attack.

1-2 Purpose.

1-2.1* This document is a training standard designed to provide fire departments with an objective method of measuring performance for initial fire flow delivery procedures using available personnel and equipment.

1-2.2 Nothing herein is intended to restrict any jurisdiction from exceeding these minimum requirements.

1-3 Definitions.

Attack Line. A hose line used primarily to apply water directly onto a fire and operated by a sufficient number of personnel so that it can be maneuvered effectively and safely.

Back-up Line. An additional hose line used to reinforce and protect personnel in the event the initial attack proves inadequate.

Company. The basic fire-fighting organizational unit staffed by various grades of fire fighters under the supervision of an officer and assigned to one or more specific pieces of apparatus.

Effective Operation. The accomplishment or ability to accomplish the intended task.

Effective Stream. A fire stream that has achieved and sustained the proper flow.

Engine. A fire department pumper having a rated capacity of 750 gpm (2840 Lpm) or more.

Engine Company. A group of fire fighters who work as a unit and are equipped with one or more pumping engines having rated capacities of 750 gpm (2840 Lpm) or more.

Evolution. A set of prescribed actions that result in an effective fire ground activity.

GPM. Gallons per minute (U.S.).

Initial Attack Line. The first hose stream placed in service by a company at the scene of a fire in order to protect lives or to prevent further extension of fire while additional lines are being laid and placed in position.

Large Diameter Hose. A hose 3.5 in. (8.9 cm) or larger designed to move large volumes of water to supply master stream appliances, portable hydrants, manifolds, standpipe and sprinkler systems, and fire department pumpers from hydrants and in relay.

Leader Line. A hose line supplying one or more smaller lines, as in a wyed line (also called a supply line).

Line. One or more lengths of connected fire hose.

LPM. Liters per minute.

Preconnected Line. A discharge hose line already attached to an engine outlet.

PSI. Pounds per square inch.

Residual Pressure. The pressure remaining in a system while fluid is flowing.

Shall. Indicates a mandatory requirement.

Should. Indicates a recommendation or that which is advised but not required.

Supply Line. One or more lengths of connected fire hose used to provide water to wyed lines or to the intake of a pump.

1-4 Units. In this standard, values for measurement are followed by an equivalent in parentheses, but only the first stated value shall be regarded as the requirement. Equivalent values in parentheses shall not be considered as the requirement, as these values might be approximate.

Chapter 2 Methods of Evaluation

2-1 Standard Evolutions.

2-1.1* The evolutions specified in this standard shall be used to measure the initial attack capability of a department's first responding unit(s) and personnel.

2-1.2 The evolutions used shall be those the department normally uses in its regular engine company operations.

2-1.3 The hose layouts and hydrant connections used shall provide the flow necessary to adequately supply the requirements of each evolution, and proper hose connections shall be made between the hydrant(s) or other water source(s) and the engine(s) and inlets.

2-2 Hose Loads and Layouts.

2-2.1 Hose shall be loaded in the manner utilized by the department, and hose lays and carries used during the evolutions shall be those normally used by the department.

2-2.2 The initial attack lines shall be preconnected to an engine outlet, supplied through a wye from another line, or connected to an engine outlet at the scene.

2-2.3* Direct hydrant streams shall not be used unless the desired flow is available at the hydrant with a residual pressure of 100 psi (690 kPa) or greater.

2-2.4 Depending on the size of hose lines to be used and the quantity of water to be delivered, the proper number of personnel shall be assigned to ensure the safety of all personnel involved and shall be in compliance with 6-4.1 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.* A minimum of two fire fighters shall be used on each hose line to keep interior attack lines under control.

Chapter 3 Logistics

3-1 Facilities.

3-1.1 Evolutions shall be conducted in an area of sufficient size where supply hose can be laid to or from the water source and attack lines laid from an engine or wye.

3-1.2 Where evolutions are not conducted at the fire department training facility or in another controlled area, non-fire department vehicular and pedestrian traffic shall be excluded from the area or shall be under the control of authorized traffic control persons.

3-2 Equipment and Personnel.

3-2.1 All personnel involved in evolutions shall wear proper protective clothing and equipment for their respective functions. All personnel participating in extending or operating handlines, extending support lines, or who are involved in other operational functions of the evolutions shall wear full protective clothing, equipment, and self-contained breathing apparatus as specified in Sections 5-2 and 5-3 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

3-2.2 All drivers/operators of fire department vehicles participating in evolutions shall comply with the requirements of Section 4-2 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

3-2.3 All personnel riding on fire department vehicles participating in evolutions shall comply with the applicable requirements of Section 4-3 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

3-2.4* The number of units and personnel normally assigned to respond on an initial alarm shall report to the training officer at the assigned area. In volunteer or call departments, the number of personnel utilized shall be limited to the average staffing that normally responds.

3-2.5 Apparatus to be deployed shall consist of not more than those of the companies that are normally assigned to respond on the initial alarm. Where companies are equipped with two pieces of apparatus, they shall operate in the normal manner, using both pieces.

3-2.6 Nozzles used shall be of the type provided on the apparatus.

3-3 Water Supply.

3-3.1 The water supply shall consist of a water source capable of supplying the required flow needed for the operation.

3-3.2 The water supply shall require one or more hydrants, a drafting location, or a tanker shuttle.

Chapter 4 Required Performance for Handlines

4-1 General.

4-1.1* The required performance for handlines shall consist of obtaining a water supply through one or two supply lines, placing one initial attack line into operation, and providing immediate back-up with another line.

4-1.2 Handline evolutions shall be performed by the first unit(s) to arrive staffed with the average number of personnel that ordinarily respond.

4-1.3* For evolutions involving two or more companies, there shall be a 30-sec delay between the arrival of each company.

4-2 Required Flow.

4-2.1 The total flow of the required streams shall be a minimum of 300 gpm (1140 Lpm).

4-2.2 The initial attack line shall provide a minimum flow of 100 gpm (380 Lpm) from the nozzle.

4-2.3 The required flow from the back-up line shall be a minimum of 200 gpm (760 Lpm).

4-2.4* The training officer shall determine that effective pressure and flows are provided at each nozzle. Where solid stream nozzles are used, the nozzle pressure shall be at least 50 psi (345 kPa). Where combination nozzles are used, the nozzle pressure shall be at least 100 psi (690 kPa). Pressures shall be within a range of ±10 percent.

4-3 Hose Evolutions.

4-3.1 The supply line(s) shall be laid by an engine for a distance of 300 ft (92 m) to or from the hydrant or water source. Where large diameter hose is used, a single line shall be permitted.

4-3.2* The initial attack line and back-up line shall be advanced by hand for a minimum distance of 150 ft (46 m) before streams are activated.

4-3.3* Where an apparatus water tank supply is used to supply the initial attack line, the back-up line shall not be charged until an adequate water supply is established.

4-4 Method of Evaluation.

4-4.1 When the order is given to begin evolution, one or more supply lines, one initial attack line, and one back-up line shall be advanced and placed in operation, using the required pressures and flows within the recommended time period.

4-4.2 The evaluation shall be based on the following considerations:

(a) The ability to place one or two supply lines, one initial attack line, and one back-up line into service without delay; and

(b) The ability to deliver a minimum of 300 gpm (1135 Lpm) through two handlines to produce effective streams.

4-4.3 Once streams are placed into service, the flows shall continue until the evaluation is complete.

4-4.4* Failure to supply an engine adequately shall be considered a serious deficiency in operations.

4-4.5* Failure to maintain water pressure in any line until all lines are properly operating shall be considered an unacceptable interruption of the attack. Interruptions of less than 10 sec shall not be counted.

4-4.6 The evolution shall not be concluded until the evaluating officer is satisfied that an effective stream has been obtained at each nozzle.

4-5* Evaluation. Performance shall be evaluated as follows:

	Satisfactory	Unsatisfactory
(a) Was a minimum of 300 gpm (1135 Lpm) delivered?	_____	_____
(b) Were nozzle pressures and flows correct?	_____	_____
(c) Were effective streams in service within the recommended time?	_____	_____
(d) Were the hose layouts from the water source adequate to supply engines?	_____	_____
(e) Were streams operated without major interruption?	_____	_____

Chapter 5 Required Performance for Master Streams

5-1 General.

5-1.1* The required performance for master streams shall consist of laying one or more supply lines and placing a master stream appliance in operation.

5-1.2 Master stream evolutions shall be performed by the first unit(s) to arrive staffed with the average number of personnel that ordinarily respond.

5-1.3* For evolutions involving two or more companies, there shall be a 30-sec delay between the arrival of each company.

5-2 Required Flow.

5-2.1 The total flow of the required master stream shall be a minimum of 500 gpm (1890 Lpm).

5-2.2* The training officer shall determine that effective pressures and flows are provided at the master stream appliance nozzle. Where solid stream nozzles are used, the nozzle pressure shall be at least 50 psi (345 kPa). Where combination nozzles are used, the nozzle pressure shall be at least 100 psi (690 kPa). Pressures shall be within a range of ±10 percent.

5-3 Hose Evolutions.

5-3.1 Where engine supply lines are laid from a hydrant or water source to supply an engine-mounted master stream appliance, two engine supply lines shall be laid by the engine for a distance of 300 ft (92 m). Where large diameter hose is used, a single engine supply line shall be permitted.

5-3.2 Where master stream supply lines are laid from a demounted, portable master stream appliance to an engine at a hydrant or water source, two master stream supply lines shall be laid by the engine for a distance of 300 ft (92 m). Where large-diameter hose is used, a single master stream supply line shall be permitted.

5-4 Method of Evaluation.

5-4.1 When the order is given to begin the evolution, one or more supply lines shall be laid to supply the engine(s), and, if required by the evolution, one or more supply lines shall be laid to supply the master stream appliance. The master stream appliance shall be placed into effective operation, with the stream at the required pressures and flows within the recommended time period.

5-4.2 The evaluation shall be based on the following considerations:

(a) The ability to supply the master stream appliance without delay; and

(b) The ability to deliver at least 500 gpm (1890 Lpm) and produce an effective master stream.

5-4.3 Once streams are placed into service, the flows shall continue until the evaluation is complete.

5-4.4* Failure to supply an engine adequately shall be considered a serious deficiency in operations.

5-4.5* Failure to maintain water pressure in any line until all lines are properly operating shall be considered an unacceptable interruption of the attack. Interruptions of less than 10 sec shall not be counted.

5-4.6 The evolution shall not be concluded until the evaluating officer is satisfied that an effective stream has been obtained.

5-5* Evaluation. Performance shall be evaluated as follows:

	Satisfactory	Unsatisfactory
(a) Was a minimum of 500 gpm (1890 Lpm) delivered?	_____	_____
(b) Were nozzle pressures and flows correct?	_____	_____
(c) Was an effective stream in service within the recommended time?	_____	_____
(d) Were the hose layouts adequate to supply the nozzles?	_____	_____
(e) Was stream operated without major interruption?	_____	_____

Chapter 6 Required Performance for Automatic Sprinkler System Support

6-1 General.

6-1.1* The required performance for automatic sprinkler system support shall consist of providing two supply lines to an automatic sprinkler connection.

6-1.2 Automatic sprinkler system support evolutions shall be performed by the first unit(s) to arrive staffed with the average number of personnel that ordinarily respond.

6-1.3* For evolutions employing two or more companies, there shall be a 30-sec delay between the arrival of each company.

6-2 Required Flow.

6-2.1 The total flow of the required lines to the sprinkler connection shall be 500 gpm (1890 Lpm).

6-2.2* The training officer shall determine that effective pressures and flows are provided to the sprinkler connections. A minimum of 150 psi (1035 kPa) pump discharge pressure shall be used to supply the sprinkler system. Pressures shall be within a range of ±10 percent.

6-3 Hose Evolutions.

6-3.1 The supply lines shall be laid by an engine for a distance of 300 ft (92 m) to or from the hydrant or water source, and for a distance of 100 ft (30.5 m) from an engine to the sprinkler connection.

6-3.2 Apparatus water tanks shall not be used as a water supply for these evolutions.

6-4 Method of Evaluation.

6-4.1 When the order is given to begin the evolution, a water supply shall be established for the engine(s) and two supply lines laid to the sprinkler connection.

6-4.2 The evaluation shall be based on the ability to deliver a minimum of 500 gpm (1890 Lpm) through two supply lines to the sprinkler connections.

6-4.3 The flows shall continue until the evaluation is complete.

6-4.4* Failure to supply an engine adequately shall be considered a serious deficiency in operations.

6-4.5* Failure to maintain water pressure in any line until all lines are properly operating shall be considered an unacceptable interruption. Interruptions of less than 10 sec shall not be counted.

6-4.6 The evolution shall not be concluded until the evaluating officer is satisfied that the proper flows have been provided.

6-5* Evaluation. Performance shall be evaluated as follows:

	Satisfactory	Unsatisfactory
(a) Was a minimum of 500 gpm (1890 Lpm) delivered?	_____	_____
(b) Was the pump discharge pressure correct?	_____	_____
(c) Were flows obtained within the recommended time?	_____	_____
(d) Were the hose layouts from the water source adequate?	_____	_____
(e) Were flows obtained without major interruption?	_____	_____

Chapter 7 Referenced Publication

7-1 The following document, or portions thereof, is referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for the reference is the current edition as of the date of the NFPA issuance of this document.

7-1.1 NFPA Publication. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 1901, Quincy, MA 02269-1901.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 1992 edition.

Appendix A Explanatory Material

Appendix A is not a part of the requirements of this NFPA document but is included for informational purposes only. This appendix contains explanatory material, numbered to correspond with the applicable text paragraphs.

A-1-1.1 It is recognized that most successful fire-fighting efforts involve a coordinated engine, ladder, and rescue company operation; however, this standard addresses only the basic engine company operations of laying supply lines, advancing attack and back-up lines, supplying special devices, and operating engines. When performing these evolutions for the purpose of training, departments should use the number of personnel normally assigned to perform engine company operations at the scene of a fire.

A-1-2.1 Three aspects of initial fire attack are covered in this standard:

(a) Handlines, $1^1/_2$ in. (38 mm) to $2^1/_2$ in. (65 mm);

(b) Master stream appliances, portable and apparatus-mounted; and

(c) Automatic sprinkler system support.

Individual fire-fighting evolutions involving the placement and connection of hose lines and the operation of hose streams and apparatus are the essentials of good fire department procedures. This standard provides the fire chief and other department officers a method of measuring the effectiveness of these evolutions based on their normal first alarm engine company response.

With the exception of very small communities and isolated rural areas, standard engine response to structural fires on the initial alarm is generally a minimum of two engine companies. There are several reasons for this practice. First, one engine company ordinarily cannot be expected to both operate the proper streams promptly for fast attack and also provide the necessary back-up stream(s), and experience frequently has shown that small streams often prove inadequate. Second, fires commonly necessitate prompt application of hose streams from at least two positions. Third, there is always the possibility that an accident or mechanical failure will delay the arrival of one company.

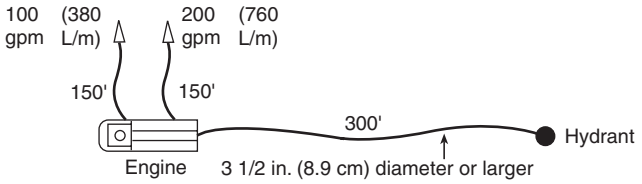
A-2-1.1 With the exception of those evolutions that use aerial trucks, only the number of personnel that normally respond on the initial alarm who are assigned to perform engine company operations should perform the evolutions required by this standard. For evolutions involving aerial trucks, personnel normally assigned to perform ladder operations on alarms should also be included.

A-2-2.3 The purpose of these evolutions is to test the fire department's ability to place fire suppression streams with correct flows and nozzle pressures into service promptly. Direct streams from hydrants, unless they are high-pressure hydrants, usually do not provide the proper flows and nozzle pressures. Where this practice is used, serious delays often are encountered before effective streams are in service. Therefore, this practice is not considered valid by this standard.

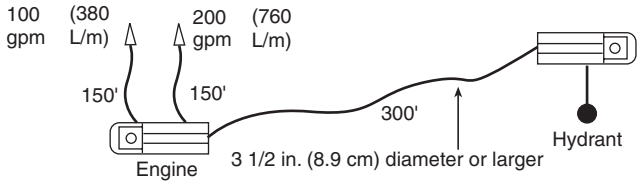
A-3-2.4 The limitation of emergency scene operations to those that can be safely conducted by the number of personnel on the scene is intended to reduce the risk of fire fighter death or injury due to understaffing. While members can be assigned and can arrive at the scene of an incident in many different ways, it is strongly recommended that interior fire-fighting operations not be conducted without an adequate number of qualified fire fighters operating in companies under the supervision of company officers available on the scene.

It is recommended that a minimum acceptable fire company staffing level consist of four members responding on or arriving with each engine or aerial ladder company responding to any type of fire. Companies responding in high fire-risk areas should have a minimum acceptable staffing of six fire fighters on ladder companies and five fire fighters on engine companies. These recommendations are based on experience from actual fires and in-depth fire simulations wherein fire company effectiveness was critically and objectively evaluated. These studies indicate significant reductions in performance and safety when crews have fewer members than recommended. Overall, five-member crews were found to provide a more coordinated approach for search and rescue and fire suppression tasks. (*See NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, A-6-4.1.*)

A-4-1.1 The following are illustrations of some handline evolutions that can be used:

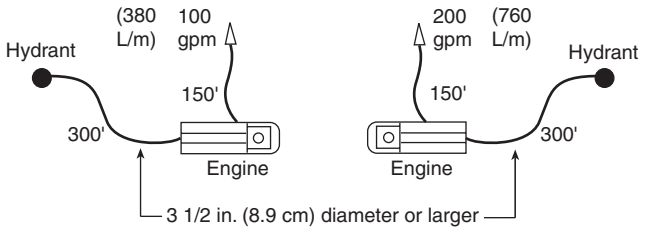


No. 1 Forward lay using one engine and one supply line. Recommended maximum time: 3 min



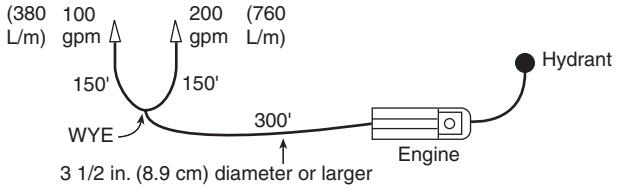
No. 2 Reverse lay from first engine with second engine. Recommended maximum time: 4 min

A-4-1.3 The delay in placing the second and additional companies into service recognizes the fact that, in many cases, the companies do not arrive simultaneously. This can be due to such factors as volunteer response and traffic conditions. The delay also provides the evaluator with a greater opportunity to check the operations of the second and any additional companies. This is only a suggested procedure for the purposes of the test. The evaluator can increase the time interval to simulate conditions where responding companies are located at greater distances from one another.

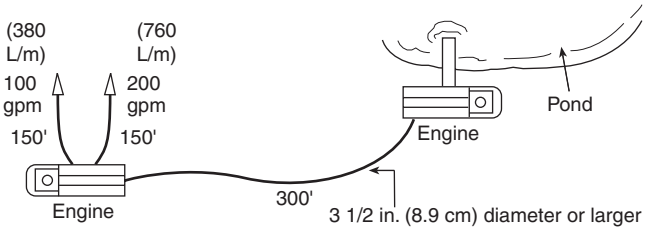


No. 3 Forward lays using two engines. Recommended maximum time: 3.5 min

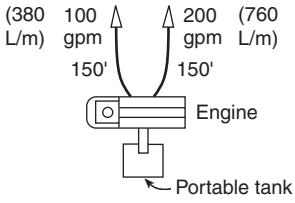
A-4-2.4 Pressure and flow can be determined either by Pitot gauge measurement, piezometer gauge readings, flow meter readings, or by pump discharge gauge readings based on known pressure requirements for the particular nozzles. Spray nozzles can be estimated based on their rated delivery if the proper pump pressure is provided.



No. 4 Reverse lay with one engine using a wye. Recommended maximum time: 4 min



No. 5 Drafting operation using two engines. Recommended maximum time: 6 min



No. 6 Portable water supply tank using one engine and water supply apparatus. Recommended maximum time: 5 min

A-4-3.2 This is done to demonstrate the ability to advance the hose lines to necessary positions of operation. The evaluator should designate the positions where streams will be operated.

A-4-3.3 Establishing an adequate water supply is a primary consideration of the pump operator, and charging the back-up line without an adequate water supply can jeopardize the safety of the initial attack crew. There might be times when the back-up line has to be charged from the booster tank; however, in these instances, the pump operator should be acutely aware of the flow rates of the lines in service and the capacity

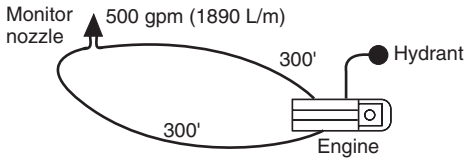
of the booster tank. In those cases where units have booster tanks of 1000 gal (3785 L) or more, or where multiple units are available to provide additional water, charging the back-up line from a booster tank might be permitted.

A-4-4.4 Failure to make adequate connections to utilize the available water supply promptly is one of the most serious errors made during an initial attack on a fire. Placing streams into service quickly when they lack adequate volume and pressure cannot be considered as furnishing a standard initial fire attack. The most common cause of failure is dependence on a single $2^1/_2$-in. (65-mm) supply line to provide the necessary flow.

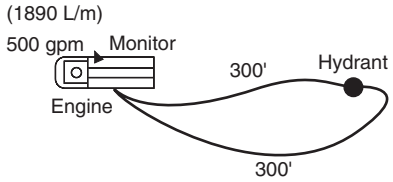
A-4-4.5 Up to 10 sec of interruption may be permitted to manage situations such as transfer from tank to water supply or shifting of lines from hydrants to pumps. Failure to obtain water from a hydrant before the booster tank is empty, or the inability to maintain flow when transferring from tank to hydrant supply, is unacceptable.

A-4-5 The evaluation should be useful to the training officer in determining areas where additional training is needed to provide a standard initial fire attack capability. It should not be considered surprising if the first test of these evolutions produces performance that is not fully satisfactory. Teamwork between companies for effective initial attack develops with practice.

A-5-1.1 The following are illustrations of some master stream evolutions that can be used:



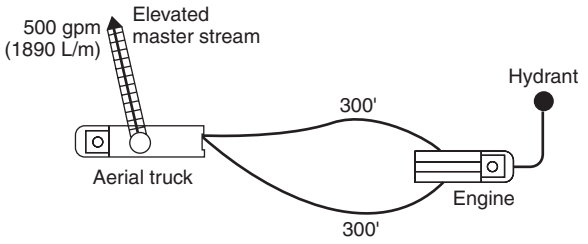
No. 7 Reverse lay from portable monitor nozzle using one engine. Recommended maximum time: 5 min



No. 8 Forward lay with one engine and using engine monitor. Recommended maximum time: 3 min

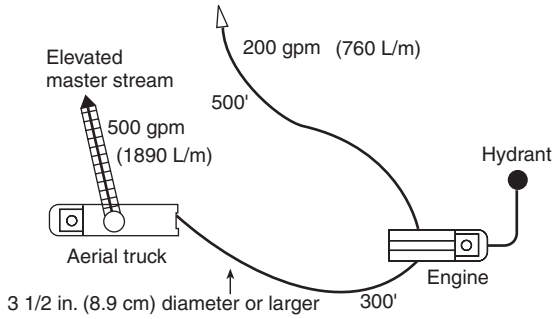
A-5-1.3 The delay in placing the second and additional companies into service recognizes the fact that, in many cases, the companies do not arrive simultaneously. This can be due to such factors as volunteer response and traffic conditions. The delay also provides the evaluator with a greater opportunity to check the operations of the second and any additional companies. This is only a suggested procedure for the purposes of the test. The evaluator can increase the time interval to simulate conditions where responding companies are located at greater distances from one another.

A-5-2.2 Pressure and flow can be determined either by Pitot gauge measurement, piezometer gauge readings, flow meter readings, or by pump discharge gauge readings based on known pressure requirements for the particular nozzles. Spray nozzles can be estimated based on their rated delivery if the proper pump pressure is provided.

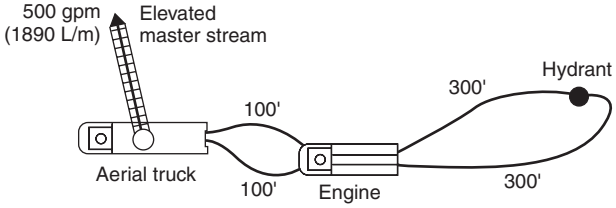


No. 9 Reverse lay from elevated master stream using one engine. Recommended maximum time: 4 min

A-5-4.4 Failure to make adequate connections to utilize the available water supply promptly is one of the most serious errors made during an initial attack on a fire. Placing streams into service quickly when they lack adequate volume and pressure cannot be considered as furnishing a standard initial fire attack. The most common cause of failure is dependence on a single $2^1/_2$-in. (65-mm) supply line to provide the necessary flow. At least two $2^1/_2$-in. (65-mm) supply lines or one large supply hose would be necessary to carry the needed flows at the necessary pressures.



No. 10 Reverse lay from elevated master stream using one engine and supplying one handline. Recommended maximum time: 5.5 min

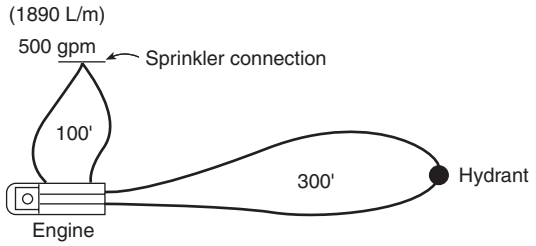


No. 11 Forward lay using one engine to supply an elevated master stream with two lines. Recommended maximum time: 5 min

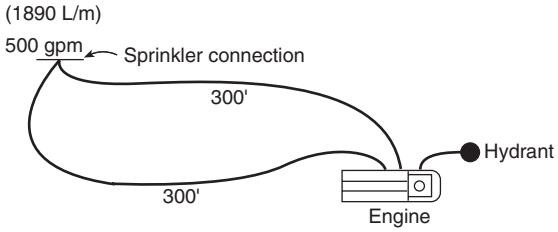
A-5-4.5 Up to 10 sec of interruption may be permitted to manage situations such as transfer from tank to water supply or shifting of lines from hydrants to pumps. Failure to obtain water from a hydrant before the booster tank is empty, or the inability to maintain flow when transferring from tank to hydrant supply, is unacceptable.

A-5-5 The evaluation should be useful to the training officer in determining areas where additional training is needed in aerial ladder set-up or the company's ability to provide a high-volume, limited duration offensive attack (blitz attack). It should not be considered surprising if the first test of these evolutions produces performance that is not fully satisfactory. Teamwork between companies for an effective blitz attack develops with practice.

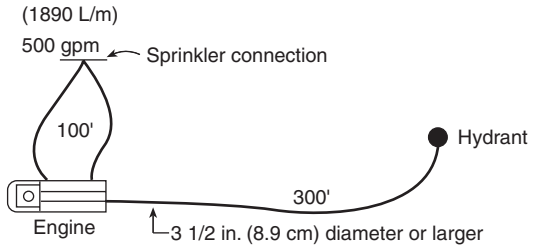
A-6-1.1 The following are illustrations of some automatic sprinkler system support evolutions that can be used:



No. 12 Forward lay to the sprinkler connection using two supply lines. Recommended maximum time: 3.5 min



No. 13 Reverse lay from the sprinkler connection using two supply lines. Recommended maximum time: 3.5 min



No. 14 Forward lay to the sprinkler connection using large-diameter hose. Recommended maximum time: 3.5 min

A-6-1.3 The delay in placing the second and additional companies into service recognizes the fact that, in many cases, the companies do not arrive simultaneously. This can be due to such factors as volunteer response and traffic conditions. The delay also provides the evaluator with a greater opportunity to check the operations of the second and any additional companies. This is only a suggested procedure for the purposes of the test. The evaluator can increase the time interval to simulate conditions where responding companies are located at greater distances from one another.

A-6-2.2 Pressure and flow can be determined either by Pitot gauge measurement, piezometer gauge readings, flow meter readings, or by pump discharge gauge readings.

A-6-4.4 Failure to make adequate connections to utilize the available water supply promptly is one of the most serious errors made when supplying an automatic sprinkler system. The most common cause of failure is dependence on a single $2^1/_2$-in. (65-mm) supply line to provide the necessary flow. At least two $2^1/_2$-in. (65-mm) supply lines or one large-diameter hose line would be necessary to carry the needed flows at the necessary pressures.

A-6-4.5 Up to 10 sec of interruption may be permitted to manage situations such as transfer from tank to water supply or shifting of lines from hydrants to pumps. Failure to obtain water from a hydrant before the booster tank is empty, or the inability to maintain flow when transferring from tank to hydrant supply, is unacceptable.

A-6-5 The evaluation should be useful to the training officer in determining areas where additional training is needed to provide water supply to an automatic sprinkler system. It should not be considered surprising if the first test of these evolutions produces performance that is not fully satisfactory. Teamwork between companies for effective initial attack develops with practice.

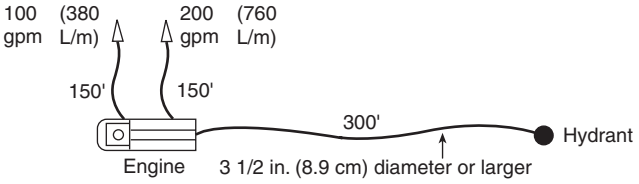
Appendix B Evaluation Guide Sheets and Instructions

This Appendix is not a part of the requirements of this NFPA document but is included for informational purposes only.

B-1 The following guide sheets are provided to assist training personnel when using the evolutions illustrated in Appendix A.

All personnel involved in the evolutions are to be properly clothed in the appropriate safety gear or fire-fighting protective clothing and equipment as specified in 3-2.1.

The total number of personnel used for each evolution should not exceed the number of persons that normally respond on the initial alarm in accordance with 4-1.2, 5-1.2, and 6-1.2. Some evolutions use one engine company, and the number of personnel used should be limited to a single engine complement, unless more than one unit responds as part of that engine company on the initial alarm. All personnel over the number that normally staff the first engine company should be delayed 30 sec before entering the evolutions.



Evolution No. 1 Forward lay using one engine and one supply line.

This evolution uses one engine company, one supply line, and two handlines. If the number of personnel used to perform this evolution exceeds the normal single-engine company staffing, the additional personnel should be delayed 30 sec before becoming involved in the evolution.

1. Stage engine company and assigned personnel away from the hydrant. When personnel are ready, give signal for engine to proceed to hydrant.

2. START TIME WHEN ENGINE STOPS AT THE HYDRANT. (Do not allow additional personnel to start for 30 sec.)

3. Steps of operation:

(a) Lay one supply line from the hydrant a distance of 300 ft (90 m).

(b) Advance one attack line from the engine a distance of 150 ft (45 m).

(c) Advance one back-up line from the engine a distance of 150 ft (45 m).

(d) Operate all lines at proper pressures and flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in item 6 below.)

5. Equipment and personnel used in test:

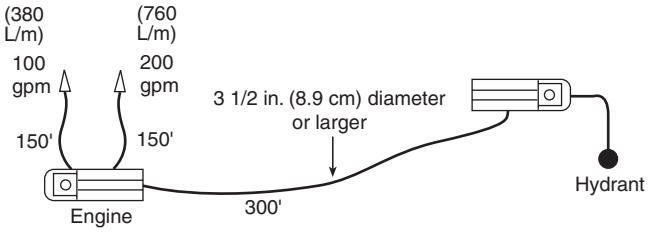
(a) Size of supply line used? _____

(b) Size of attack line used? _____

(c) Size of back-up line used? _____

(d) Number of persons used? _____

6. Total time of evolution? _____



Evolution No. 2 Reverse lay from first engine with second engine; connecting second engine to hydrant is optional.

This evolution uses two engines, one supply line, and two handlines. A 30-sec delay should be used to start the second engine company and all personnel over the normal staffing of the first engine company.

1. Stage engines and assigned personnel away from the simulated fire area. When personnel are ready, give signal for first engine company to proceed to the fire area.

2. START TIME WHEN FIRST ENGINE STOPS AT THE FIRE AREA. (Do not allow second engine and additional personnel to start for 30 sec.)

3. Steps of operation:

(a) At the fire area, remove and advance one attack line and one back-up line a minimum distance of 150 ft (45 m) from the first engine.

(b) After a 30-sec delay, give signal for second engine to proceed to location of first engine.

(c) When second engine is stopped at first engine, supply hose is removed from second engine, and second engine proceeds to hydrant location.

(d) Supply hose is connected to first engine and either supply hose or second engine is connected to hydrant.

(e) Operate all lines at proper pressures and flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in item 6 below.)

5. Equipment and personnel used in test:

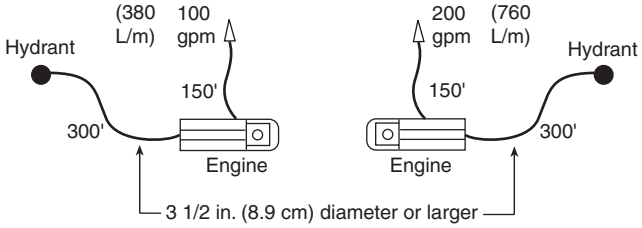
(a) Size of supply line used? _____

(b) Size of attack line used? _____

(c) Size of back-up line used? _____

(d) Number of persons used? _____

6. Total time of evolution? _____



Evolution No. 3 Forward lays using two engines.

This evolution uses two engines, two hydrants, two supply lines, and two handlines. A 30-sec delay should be used to start the second engine company and all personnel over the normal staffing of the first engine company.

1. Stage engine companies and assigned personnel away from the hydrants. When personnel are ready, give signal for first engine company to proceed to hydrant.

2. START TIME WHEN ENGINE STOPS AT THE HYDRANT. (Do not allow additional personnel to start for 30 sec.)

3. Steps of operation:

(a) First engine lays one supply line from the hydrant a distance of 300 ft (90 m).

(b) One attack line is advanced from the first engine a distance of 150 ft (45 m).

(c) Second engine lays one supply line from the hydrant a distance of 300 ft (90 Lm).

(d) One back-up line is advanced from the second engine a distance of 150 ft (45m).

(e) Operate all lines at proper pressures and flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in item 6 below.)

5. Equipment and personnel used in test:

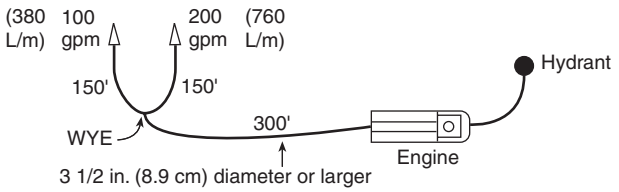
(a) Size of supply line used? _____

(b) Size of attack line used? _____

(c) Size of back-up line used? _____

(d) Number of persons used? _____

6. Total time of evolution? _____



Evolution No. 4 Reverse lay with one engine using a wye.

This evolution uses one engine company, one supply line, and two handlines operated from a wye. If the number of personnel used to perform this evolution exceeds the staffing for a normal single-engine company, the additional personnel should be delayed 30 sec before becoming involved in the evolution.

1. Stage engine company and assigned personnel away from the simulated fire area. When personnel are ready, give signal for engine to proceed to the fire area.

2. START TIME WHEN ENGINE STOPS AT THE FIRE AREA. (Do not allow additional personnel to start for 30 sec.)

3. Steps of operation:

(a) At the fire area, remove two attack lines, wye, and leader line from the engine.

(b) Lay leader line to hydrant a distance of 300 ft (90 m) and connect engine to hydrant.

(c) At the fire area, connect attack line and back-up line to wye and advance 150 ft (45 m).

(d) Operate all lines at proper pressures and flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in item 6 below.)

5. Equipment and personnel used in test:

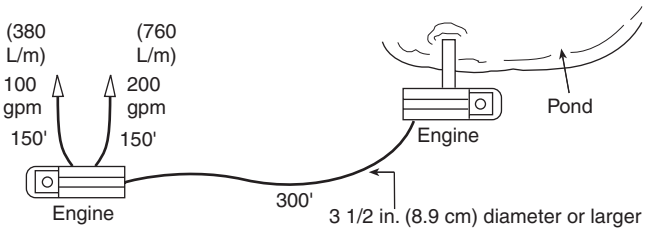
(a) Size of supply line used? _____

(b) Size of attack line used? _____

(c) Size of back-up line used? _____

(d) Number of persons used? _____

6. Total time of evolution? _____



Evolution No. 5 Drafting operations using two engines.

This evolution uses two engines, one supply line, and two handlines. A 30-sec delay should be used to start the second engine and all personnel over the normal staffing of the first engine.

1. Stage engines and assigned personnel away from the simulated fire area. When personnel are ready, give signal for engine to proceed to the fire area.

2. START TIME WHEN ENGINE STOPS AT THE FIRE AREA. (Do not allow additional personnel to start for 30 sec.)

3. Steps of operation:

(a) At the fire area, remove and advance one attack line and one back-up line a minimum distance of 150 ft (45 m) from the first engine.

(b) After a 30-sec delay, give signal for second engine to proceed to location of first engine.

(c) When second engine is stopped at first engine, supply hose is removed from second engine, and second engine proceeds to water source and sets up for drafting operations.

(d) Operate all lines at proper pressures and flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in item 6 below.)

5. Equipment and personnel used in test:

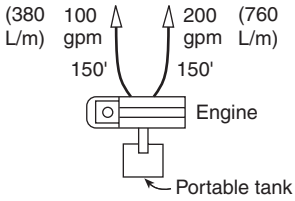
(a) Size of supply line used? _____

(b) Size of attack line used? _____

(c) Size of back-up line used? _____

(d) Number of persons used? _____

6. Total time of evolution? _____



Evolution No. 6 Portable water supply tank using one engine and water supply apparatus.

This evolution uses one engine operating from a water supply tank, two handlines, and water supply apparatus. If the number of personnel used to perform this evolution exceeds the staffing for a normal single-engine company and a water supply apparatus, the additional personnel should be delayed 30 sec before becoming involved in the evolution.

1. Stage engine company, water supply apparatus, and assigned personnel away from the simulated fire area. When personnel are ready, give signal for engine to proceed to fire area.

2. START TIME WHEN ENGINE STOPS AT THE FIRE AREA. (Do not allow additional personnel to start for 30 sec.)

3. Steps of operation:

(a) At the fire area, remove and advance one attack line and one back-up line a minimum distance of 150 ft (45 m) from the engine.

(b) After a 30-sec delay, locate water supply tank at fire area, fill tank, and establish water supply to engine.

(c) Maintain water supply through continuous tanker operations.

(d) Operate all lines at proper pressures and flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in item 6 below.)

5. Equipment and personnel used in test:

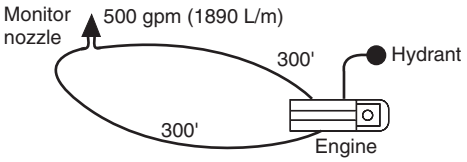
(a) Size of supply line used? _____

(b) Size of attack line used? _____

(c) Size of back-up line used? _____

(d) Number of persons used? _____

6. Total time of evolution? _____



Evolution No. 7 Reverse lay from portable master stream appliance using one engine.

This evolution uses one engine, one portable master stream appliance, and two supply lines. If the number of personnel used to perform this evolution exceeds the normal single-engine staffing, the additional personnel should be delayed 30 sec before becoming involved in the evolution.

1. Stage engine company and assigned personnel away from the simulated fire area. When personnel are ready, give signal for engine to proceed to fire area.

2. START TIME WHEN ENGINE STOPS AT THE FIRE AREA. (Do not allow additional personnel to start for 30 sec.)

3. Steps of operation:

(a) At the fire area, remove two supply lines from engine, locate the monitor device, and connect supply lines to the demounted, portable master stream appliance.

(b) Lay two supply lines a distance of 300 ft (90 m) and connect engine to the hydrant.

(c) Supply the master stream appliance at proper pressures and flows.

4. STOP TIME WHEN THE MASTER STREAM APPLIANCE IS SUPPLIED PROPERLY. (Record time in item 6 below.)

5. Equipment and personnel used in test:

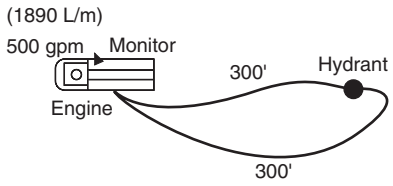
(a) Size of supply lines used? _____

(b) Size of nozzle used? _____

(c) Amount of water flowed? _____

(d) Number of persons used? _____

6. Total time of evolution? _____



Evolution No. 8 Forward lay with one engine and using an engine-mounted master stream appliance.

This evolution uses one engine, an engine-mounted master stream appliance, and two supply lines. If the number of personnel used to perform this evolution exceeds the normal single-engine staffing, the additional personnel should be delayed 30 sec before becoming involved in the evolution.

1. Stage engine company and assigned personnel away from the hydrant. When personnel are ready, give signal for engine to proceed to the hydrant.

2. START TIME WHEN ENGINE STOPS AT THE HYDRANT. (Do not allow additional personnel to start for 30 sec.)

3. Steps of operation:

(a) Lay two supply lines from the hydrant a distance of 300 ft (90 m).

(b) Place engine-mounted master stream appliance in operation and operate at proper pressures and flows.

4. STOP TIME WHEN THE MASTER STREAM APPLIANCE IS SUPPLIED PROPERLY. (Record time in item 6 below.)

5. Equipment and personnel used in test:

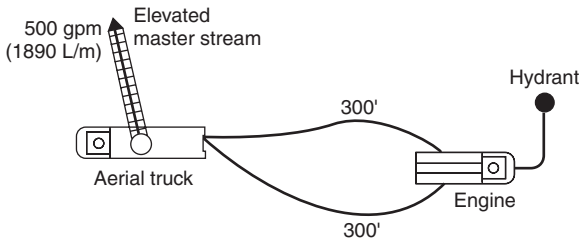
(a) Size of supply lines used? _____

(b) Size of nozzle used? _____

(c) Amount of water flowed? _____

(d) Number of persons used? _____

6. Total time of evolution? _____



Evolution No. 9 Reverse lay from apparatus equipped with an elevated master stream appliance using one engine.

This evolution uses one aerial truck with an elevated master stream appliance, one engine, and two supply lines. The number of personnel used to perform this evolution should not exceed the normal engine and ladder company staffing.

1. Stage all apparatus and assigned personnel away from the simulated fire area. When personnel are ready, give signal for engine to proceed to the fire area.

2. START TIME WHEN FIRST VEHICLE STOPS AT THE FIRE AREA. (Do not allow additional personnel to start for 30 sec.)

3. Steps of operation:

(a) Position apparatus and prepare elevated master stream for service.

(b) Lay two supply lines a distance of 300 ft (90 m) and connect engine to the hydrant.

(c) Connect supply lines to elevated master stream appliance intake and operate the master stream at proper pressures and flows.

4. STOP TIME WHEN THE ELEVATED MASTER STREAM APPLIANCE IS SUPPLIED PROPERLY. (Record time in item 6 below.)

5. Equipment and personnel used in test:

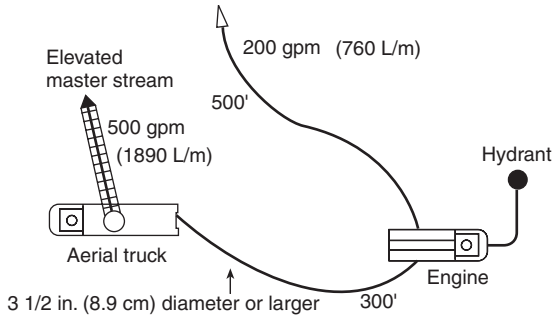
(a) Size of supply lines used? _____

(b) Size of nozzle used? _____

(c) Amount of water flowed? _____

(d) Number of persons used? _____

6. Total time of evolution? _____



Evolution No. 10 Reverse lay from apparatus equipped with elevated master stream device using one engine and supplying one handline.

This evolution uses one apparatus equipped with an elevated master stream device, one engine company, one large-diameter supply line, and one handline. The number of personnel used to perform this evolution should not exceed the normal engine and ladder company staffing.