NFPA 1002
Standard for Fire Apparatus Driver/Operator Professional Qualifications

1998 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 and standards, 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 16 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 of 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.

Licensing Policy

NFPA 1002

Standard for

Fire Apparatus Driver/Operator Professional Qualifications

1998 Edition

This edition of NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications,* was prepared by the Technical Committee on Fire Fighter Professional Qualifications, released by the Technical Correlating Committee on Professional Qualifications, and acted on by the National Fire Protection Association, Inc. at its Annual Meeting held May 18–21, 1998, in Cincinnati, OH. It was issued by the Standards Council on July 16, 1998, with an effective date of August 5, 1998, and supersedes all previous editions.

The 1998 edition of this document was approved as an American National Standard on August 6, 1998.

Origin and Development of NFPA 1002

In 1972, the Joint Council of National Fire Service Organizations (JCNFSO) created the National Professional Qualifications Board (NPQB) for the fire service to facilitate the development of nationally applicable performance standards for uniformed fire service personnel. On December 14, 1972, the board established four technical committees to develop those standards, using the National Fire Protection Association (NFPA) standards-making system. The initial committees addressed the following career areas: fire fighter, fire officer, fire service instructor, and fire inspector and investigator.

The Technical Committee on Fire Fighter Professional Qualifications met regularly after the adoption of NFPA 1001 to produce the first edition of this document, which was adopted by the NFPA in 1976. NFPA 1002 was the second in the series of fire fighter professional qualifications standards.

Subsequent to the adoption of the initial edition, the committee met regularly to revise and update the standard. Additional editions were adopted and issued by the NFPA under the auspices of the NPQB in 1982 and 1988.

The original concept of the professional qualifications standards, as directed by the JCNFSO and the NPQB, was to develop an interrelated set of performance standards specifically for the uniformed fire service. The various levels of achievement in the standards were to build upon each other within a strictly defined career ladder. In the late 1980s, revisions of the standards recognized that the documents should stand on their own merit in terms of job performance requirements for a given field. Accordingly, the strict career ladder concept was revised, except for the progression from fire fighter to fire officer, in order to allow civilian entry into many of the fields. These revisions facilitated the use of the documents by other than the uniformed fire services.

In 1990, responsibility for the appointment of professional qualifications committees and the development of the professional qualifications standards were assumed by the NFPA.

The Professional Qualifications Correlating Committee was appointed by the NFPA Standards Council in 1990 and assumed the responsibility for coordinating the requirements of all of the professional qualifications documents.

This new edition represents an effort on the part of the Technical Committee on Fire Fighter Professional Qualifications and the task group to update the standard based on several years of further use. The technical committee has also added a new chapter on mobile water supply apparatus.

The previous edition introduced the job performance requirement (JPR) format and this edition refines that format and adds more details, particularly in the requisite knowledge and skills lists. The JPR format is consistent with the other standards in the professional qualifications project. Each JPR consists of the task to be performed; the tools, equipment, or materials that must be provided to successfully complete the task; evaluation parameters and/or performance outcomes; and lists of requisite knowledge and skills one must have to be able to perform the task. More information about JPRs can be found in Appendix C.

The intent of the Technical Committee on Fire Fighter Professional Qualifications is to develop clear and concise job performance requirements that can be used to determine

that an individual, when measured to the standard, possesses the skills and knowledge to perform as a fire fighter. The committee further contends that these job performance requirements can be used in any fire department in any city, town, or private organization throughout North America.

Technical Correlating Committee on Professional Qualifications

Douglas P. Forsman, *Chair*
Oklahoma State University, OK [M]

Fred G. Allinson, Nat'l Volunteer Fire Council, WA [L]
Rep. Nat'l Volunteer Fire Council
Stephen P. Austin, State Farm Fire & Casualty Co., DE [I]
Rep. TC on Investigator Pro Qual
(VL to Professional Qualifications Systems Management)
Dan W. Bailey, USDA Forest Service, MT [E]
Rep. TC on Wildfire Suppression Pro Qual [M]
(VL to Professional Qualifications Systems Management)
Boyd F. Cole, SunnyCor Inc., IL [M]
Rep. TC on Emergency Vehicle Mechanic Technicians Pro Qual
(VL to Professional Qualifications Systems Management)
David T. Endicott, Prince William County Fire & Rescue Service, VA [U]
Rep. TC on Fire Fighter Pro Qual
(VL to Professional Qualifications Systems Management)
Jon C. Jones, Jon Jones & Assoc., MA [SE]
Rep TC Industrial Fire Brigades
(VL to Professional Qualifications Systems Management)
Charles E. Kirtley, Colorado Springs Fire Dept., CO [U]
Rep. TC on Public Fire Educator Pro Qual
(VL to Professional Qualifications Systems Management)
Jack K. McElfish, Richmond Dept. of Fire and Emergency Services, VA [E]
Rep. Int'l Assn. of Fire Chiefs
Michael J. McGovern, Pierce County Washington Fire District 2, WA [L]
Rep. Int'l Assn. of Fire Fighters
William E. Peterson, Plano Fire Dept., TX [M]
Rep. TC on Inspector Pro Qual
(VL to Professional Qualifications Systems Management)
Hugh A. Pike, U.S. Air Force Fire Protection, FL [E]
Rep. TC on Rescue Technicians Pro Qual
(VL to Professional Qualifications Systems Management)
Bruce R. Piringer, Fire & Rescue Training Inst., MO [SE]
Rep. TC on Fire Service Instructor Pro Qual
(VL to Professional Qualifications Systems Management)
Ted Vratny, Ted Vratny—Public Safety Communications Consulting, CO [U]
Rep. TC on Telecommunicator Pro Qual
(VL to Professional Qualifications Systems Management)
Alan G. Walker, Louisiana State University, LA [E]
Rep. TC on Officer Pro Qual
(VL to Professional Qualifications Systems Management)
Johnny G. Wilson, Georgia Firefighter Standards & Training Council, GA [E]
Rep. Nat'l Board on Fire Service Professional Qualifications
John P. Wolf, University of Kansas, KS [SE]
Rep. TC on Accreditation and Certification
(VL to Professional Qualifications Systems Management)

Alternates

John W. Condon, Nat'l Volunteer Fire Council, OR [L]
(Alt. to F. G. Allinson)
Michael W. Robinson, Baltimore County Fire Dept., MD
(Alt. to J. G. Wilson)

This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the 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 the management of the NFPA Professional Qualifications Project and documents related to professional qualifications for fire service, public safety, and related personnel.

Technical Committee on Fire Fighter Professional Qualifications

David T. Endicott, *Chair*
Prince William County Fire & Rescue Service, VA [U]

Steve Willis, *Secretary*
MFTE/SMTC, ME [SE]
Rep. The Alliance for Fire and Emergency Mgmt.

William Anderson, Carlsbad Fire Dept., CA [L]
Salvator Camasi, Lil Lectric Inc., WA [E]
Rep. IAFC—Volunteer Chief Officers Section
Robert J. Cantwell, Phoenix Fire Dept., AZ [U]
Jack Casner, The Great American Insurance Co., CT [I]
David R. Fischer, Dept. of Motor Vehicles and Public Safety, NV [SE]
Richard A. Fritz, University of Illinois Fire Service Inst., IL [SE]
C. Gordon Henderson, City of Rome Fire Dept., GA [E]
Rep. Georgia State Firefighter's Association Inc.
Marcia S. Holtz, City of Madison Fire Dept., WI [L]
Rep. Women in the Fire Service
F. Patrick Marlatt, University of Maryland, MD [SE]
David E. Mohr, New Durham, NH [SE]
Henry Morse, Fire Service Testing Co., Inc., NC [RT]
Hugh A. Pike, U.S. Air Force Fire Protection, FL [E]
Mickey Pophin, Texas Commission on Fire Protection, TX [E]
Thomas P. Ruane, Peoria Fire Dept., AZ [U]
Michael A. Wieder, Oklahoma State University, OK [M]
Rep. Oklahoma State University Fire Programs
Michael L. Young, Volunteer Firemen's Insurance Services, Inc., PA [I]

Alternates

Scott L. Davidson, Volunteer Firemen's Insurance Services, Inc., PA [I]
(Alt. to M. L. Young)
Collin DeWitt, Phoenix Fire Dept., AZ [U]
(Alt. to R. J. Cantwell)
Terese M. Floren, Women in the Fire Service, WI [L]
(Alt. to M. S. Holtz)
Robert H. Noll, Yukon Fire Dept., OK [M]
(Alt. to M. A. Wieder)
Ted J. Pagels, City of De Perem, WI [E]
(Alt. to S. Willis)
Robert Singletary, City of Warner Robins Fire Dept., GA [E]
(Alt. To C. G. Henderson)

This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the 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 professional competence required of fire fighters.

Contents

NFPA 1002

Standard for

Fire Apparatus Driver/Operator Professional Qualifications

1998 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 9 and Appendix B.

Chapter 1 Administration

1-1 Scope. This standard identifies the minimum job performance requirements for fire fighters who drive and operate fire apparatus.

1-2* Purpose. The purpose of this standard is to specify the minimum job performance requirements for service as a fire department emergency vehicle driver, pump operator, aerial operator, tiller operator, wildland apparatus operator, aircraft rescue and fire-fighting apparatus operator, and mobile water supply apparatus operator.

It is not the intent of this standard to restrict any jurisdiction from exceeding these minimum requirements.

1-3 General.

1-3.1 The fire department vehicle driver/operators shall be licensed to drive all vehicles they are expected to operate.

1-3.2* The fire department driver/operator shall be subject to periodic medical evaluation, as required by NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, Section 8-1, Medical Requirements, to determine that the driver/operator is medically fit to perform the duties of a fire department vehicle driver/operator.

1-3.3* All driver/operators who drive fire apparatus shall meet the objectives specified in Chapter 2.

1-3.4 The fire apparatus driver who is required to operate an apparatus equipped with an attack or fire pump shall meet the requirements of Chapter 3.

1-3.5 The fire apparatus driver who is required to operate an apparatus equipped with an aerial device shall meet the requirements of Chapter 4.

1-3.6 The fire apparatus driver who is required to function in the tiller position shall meet the requirements of Chapter 5.

1-3.7 The fire apparatus driver who is required to operate wildland fire apparatus shall meet the requirements of Chapter 6.

1-3.8 The fire apparatus driver who is required to operate aircraft rescue and fire-fighting apparatus shall meet the requirements of Chapter 7.

1-3.9 The mobile water supply apparatus driver shall meet the requirements of Chapter 8.

1-3.10* Job performance requirements defined by this standard shall be evaluated by individuals approved by the authority having jurisdiction.

1-3.11 The job performance requirements need not be mastered in the order in which they appear. The local, state/provincial, or federal training programs shall establish the instructional priority and the training program content to prepare individuals to meet the job performance requirements of this standard.

1-3.12 The job performance requirements of Chapters 2 through 8 shall be performed utilizing vehicles of similar weight, wheelbase, and function as those expected to be operated in the performance of the driver/operator's normal duties.

1-3.13* Fire apparatus drivers who are expected to operate vehicles off-road, in addition to the applicable requirements of Chapters 2 through 5, shall meet the requirements of 6-1.4.

1-4* Definitions. For the purpose of this standard, terms shall have the following meanings.

Aerial Apparatus. A piece of fire apparatus with a permanently mounted, power-operated elevating device, including aerial ladders, aerial ladder platforms, telescoping aerial platforms, articulating aerial platforms, and elevating water delivery systems.

Aerial Device. An aerial ladder, elevating platform, aerial ladder platform, or water tower that is designed to position personnel, handle materials, provide egress, and discharge water.

Aerial Operator. The fire apparatus driver who has met the requirements of Chapter 4 for the operation of apparatus equipped with aerial devices.

Aircraft Rescue and Fire-Fighting Vehicle (ARFF). A vehicle intended to carry rescue and fire-fighting equipment for rescuing occupants and combating fires in aircraft at, or in the vicinity of, an airport.

Angle of Approach. The smallest angle made between the road surface and a line drawn from the front point of ground contact of the front tire to any projection of the apparatus in front of the front axle.

Angle of Departure. The smallest angle made between the road surface and the line drawn from the rear point of ground contact of the rear tire to any projection of the apparatus behind the rear axle.

Approved.* Acceptable to the authority having jurisdiction.

Attack Pump. A centrifugal water pump permanently mounted on the apparatus with a rated capacity of 250 gpm (950 L/min) or more, but less than 750 gpm (2850 L/min), at 150 psi (1035 kPa) net pump pressure, and used for fire fighting.

Authority Having Jurisdiction.* The organization, office, or individual responsible for approving equipment, an installation, or a procedure.

Fire Apparatus. A fire department emergency vehicle used for rescue, fire suppression, or other specialized functions.

Fire Apparatus Driver. The fire fighter who has met the requirements defined in Chapter 2.

Fire Department. An organization providing rescue, fire suppression, and related activities. The term "fire department" includes any public, governmental, private, industrial, or military organization engaging in this type of activity.

Fire Department Pumper. A piece of fire apparatus with a permanently mounted fire pump that has a rated discharge capacity of 750 gpm (2850 L/min) or greater as defined in NFPA 1901, *Standard for Automotive Fire Apparatus.*

Fire Department Vehicle. Any vehicle, including fire apparatus, operated by a fire department.

Fire Pump. Any pump with a rated discharge capacity of 750 gpm (2850 L/min) or greater mounted permanently on a piece of fire apparatus.

Foam System. A system provided on fire apparatus for the delivery of a proportioned foam and water mixture for use in fire extinguishment. The system includes a concentrate tank, a method for removing the concentrate from the tank, a foam-liquid proportioning system, and a method (e.g., hand lines or fixed turret nozzles) of delivering the proportioned foam to the fire.

Job Performance Requirement. A statement that describes a specific job task, lists the items necessary to complete the task, and defines measurable or observable outcomes and evaluation areas for the specific task.

Liquid Surge. The force imposed upon a fire apparatus by the contents of a partially filled water or foam concentrate tank when the vehicle is accelerated, decelerated, or turned.

Mobile Water Supply Apparatus. A piece of fire apparatus with a primary purpose of transporting water in a tank with 1000 gal (3785 L) or greater capacity as specified in NFPA 1901, *Standard for Automotive Fire Apparatus.*

Off-Road Use. Use of fire department vehicles in areas where there is a need to traverse steep terrain or to cross natural hazards on or protruding from the ground.

Pump Operator. The fire apparatus driver/operator who has met the requirements of Chapter 3 for the operation of apparatus equipped with an attack or fire pump.

Pumping System. A pump, the piping, and associated devices mounted permanently on a piece of fire apparatus for the purpose of delivering a fire stream.

Requisite Knowledge. Fundamental knowledge one must have in order to perform a specific task.

Requisite Skills. The essential skills one must have in order to perform a specific task.

Shall. Indicates a mandatory requirement.

Task. A specific job behavior or activity.

Tiller Aerial Apparatus. A tractor-trailer aerial apparatus with a steering wheel connected to the rear axle for maneuvering the rear portion of the apparatus.

Tiller Operator. The fire apparatus driver/operator who has met the requirements of Chapter 5.

Wildland Fire Apparatus.* Apparatus intended primarily for response to wildland/vegetative fires.

Chapter 2 General Requirements

2-1 General. Prior to operating fire department vehicles, the fire apparatus driver/operator shall meet the job performance requirements defined in Sections 2-2 through 2-3.

2-2 Preventive Maintenance.

2-2.1* Perform routine tests, inspections, and servicing functions on the systems and components specified in the following list, given a fire department vehicle and its manufacturer's specifications, so that the operational status of the vehicle is verified.

- Battery(ies)
- Braking system
- Coolant system
- Electrical system
- Fuel
- Hydraulic fluids
- Oil
- Tires
- Steering system
- Belts
- Tools, appliances, and equipment

(a) *Requisite Knowledge:* Manufacturer specifications and requirements, policies, and procedures of the jurisdiction.

(b) *Requisite Skills:* The ability to use hand tools, recognize system problems, and correct any deficiency noted according to policies and procedures.

2-2.2 Document the routine tests, inspections, and servicing functions, given maintenance and inspection forms, so that all items are checked for proper operation and deficiencies are reported.

(a) *Requisite Knowledge:* Departmental requirements for documenting maintenance performed, understanding the importance of accurate record keeping.

(b) *Requisite Skills:* The ability to use tools and equipment and complete all related departmental forms.

2-3 Driving/Operating.

2-3.1* Operate a fire department vehicle, given a vehicle and a predetermined route on a public way that incorporates the maneuvers and features specified in the following list that the driver/operator is expected to encounter during normal operations, so that the vehicle is safely operated in compliance with all applicable state and local laws, departmental rules and regulations, and the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, Section 4-2.

- Four left and four right turns
- A straight section of urban business street or a two-lane rural road at least 1 mile (1.6 km) in length
- One through-intersection and two intersections where a stop has to be made
- One railroad crossing
- One curve, either left or right
- A section of limited-access highway that includes a conventional ramp entrance and exit and a section of road long enough to allow two lane changes
- A downgrade steep enough and long enough to require down-shifting and braking
- An upgrade steep enough and long enough to require gear changing to maintain speed
- One underpass or a low clearance or bridge

(a) *Requisite Knowledge:* The effects on vehicle control of liquid surge, braking reaction time, load factors, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for both roads and bridges; identification and operation of automotive gauges; and proper operation limits.

(b) *Requisite Skills:* The ability to operate passenger restraint devices, maintain safe following distances, maintain control of the vehicle while accelerating, decelerating, and turning, maintain reasonable speed for road, weather, and traffic conditions, operate safely during nonemergency conditions, operate under adverse environmental or driving surface conditions, and use automotive gauges and controls.

2-3.2* Back a vehicle from a roadway into restricted spaces on both the right and left sides of the vehicle, given a fire department vehicle, a spotter, and restricted spaces 12 ft (3.66 m) in width, requiring 90-degree right-hand and left-hand turns from the roadway, so that the vehicle is parked within the restricted areas without having to stop and pull forward and without striking obstructions.

(a) *Requisite Knowledge:* Vehicle dimensions, turning characteristics, spotter signaling, and principles of safe vehicle operation.

(b) *Requisite Skills:* The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely.

2-3.3* Maneuver a vehicle around obstructions on a roadway while moving forward and in reverse, given a fire department vehicle, a spotter for backing, and a roadway with obstructions, so that the vehicle is maneuvered through the obstructions without stopping to change the direction of travel and without striking the obstructions.

(a) *Requisite Knowledge:* Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signaling, and principles of safe vehicle operation.

(b) *Requisite Skills:* The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely.

2-3.4* Turn a fire department vehicle 180 degrees within a confined space, given a fire department vehicle, a spotter for backing, and an area in which the vehicle cannot perform a U-turn without stopping and backing up, so that the vehicle is turned 180 degrees without striking obstructions within the given space.

(a) *Requisite Knowledge:* Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signaling, and principles of safe vehicle operation.

(b) *Requisite Skills:* The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely.

2-3.5* Maneuver a fire department vehicle in areas with restricted horizontal and vertical clearances, given a fire department vehicle and a course that requires the operator to move through areas of restricted horizontal and vertical clearances, so that the operator accurately judges the ability of the vehicle to pass through the openings and so that no obstructions are struck.

(a) *Requisite Knowledge:* Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signaling, and principles of safe vehicle operation.

(b) *Requisite Skills:* The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely.

2-3.6* Operate a vehicle using defensive driving techniques under emergency conditions, given a fire department vehicle and emergency conditions, so that control of the vehicle is maintained.

(a) *Requisite Knowledge:* The effects on vehicle control of liquid surge, braking reaction time, load factors, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for both roads and bridges; identification and operation of automotive gauges; and proper operation limits.

(b) *Requisite Skills:* The ability to operate passenger restraint devices, maintain safe following distances, maintain control of the vehicle while accelerating, decelerating, and turning, maintain reasonable speed for road, weather, and traffic conditions, operate safely during nonemergency conditions, operate under adverse environmental or driving surface conditions, and use automotive gauges and controls.

2-3.7* Operate all fixed systems and equipment on the vehicle not specifically addressed elsewhere in this standard, given systems and equipment, manufacturer's specifications and instructions, and departmental policies and procedures for the systems and equipment, so that each system or piece of equipment is operated in accordance with the applicable instructions and policies.

(a) *Requisite Knowledge:* Manufacturer specifications and operating procedures, policies, and procedures of the jurisdiction.

(b) *Requisite Skills:* The ability to deploy, energize, and monitor the system or equipment and to recognize and correct system problems.

Chapter 3 Apparatus Equipped with an Attack or Fire Pump

3-1* General. The requirements of Fire Fighter I as specified in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, and the job performance requirements defined in Sections 3-1 through 3-2 shall be met prior to certification as a fire department driver/operator—pumper.

3-1.1 Perform the specified routine tests, inspections, and servicing functions specified in the following list in addition to those contained in the list in 2-2.1, given a fire department pumper and its manufacturer's specifications, so that the operational status of the pumper is verified.

- Water tank and other extinguishing agent levels (if applicable)
- Pumping systems
- Foam systems

(a) *Requisite Knowledge:* Manufacturer specifications and requirements, policies, and procedures of the jurisdiction.

(b) *Requisite Skills:* The ability to use hand tools, recognize system problems, and correct any deficiency noted according to policies and procedures.

3-1.2* Perform the practical driving exercises specified in 2-3.2 through 2-3.5, given a fire department pumper and a spotter for backing, so that each exercise is performed safely without striking the vehicle or obstructions.

(a) *Requisite Knowledge:* Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signals, and principles of safe vehicle operation.

(b) *Requisite Skills:* The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely.

3-1.3* Operate a fire department pumper over a predetermined route on a public way that incorporates the maneuvers and features specified in the list in 2-3.1, so that the vehicle is safely operated in compliance with all applicable state and local laws, departmental rules and regulations, and the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* Section 4-2.

(a) *Requisite Knowledge:* The effects on vehicle control of liquid surge, braking reaction time, load factors, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for both roads and bridges; identification and operation of automotive gauges; and proper operation limits.

(b) *Requisite Skills:* The ability to operate passenger restraint devices, maintain safe following distances, maintain control of the vehicle while accelerating, decelerating, and turning, maintain reasonable speed for road, weather, and traffic conditions, operate safely during nonemergency conditions, operate under adverse environmental or driving surface conditions, and use automotive gauges and controls.

3-2 Operations.

3-2.1* Produce effective hand or master streams, given the sources specified in the following list, so that the pump is safely engaged, all pressure control and vehicle safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is continuously monitored for potential problems.

- Internal tank
- Pressurized source
- Static source
- Transfer from internal tank to external source

(a) *Requisite Knowledge:* Hydraulic calculations for friction loss and flow using both written formulas and estimation methods, safe operation of the pump, problems related to small-diameter or dead-end mains, low-pressure and private water supply systems, hydrant coding systems, and reliability of static sources.

(b) *Requisite Skills:* The ability to position a fire department pumper to operate at a fire hydrant and at a static water source, power transfer from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose lines, nozzles, valves, and appliances.

3-2.2 Pump a supply line of $2^1/_2$ in. (65 mm) or larger, given a relay pumping evolution the length and size of the line and the desired flow and intake pressure, so that the proper pressure and flow are provided to the next pumper in the relay.

(a) *Requisite Knowledge:* Hydraulic calculations for friction loss and flow using both written formulas and estimation methods, safe operation of the pump, problems related to small-diameter or dead-end mains, low-pressure and private water supply systems, hydrant coding systems, and reliability of static sources.

(b) *Requisite Skills:* The ability to position a fire department pumper to operate at a fire hydrant and at a static water source, power transfer from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose lines, nozzles, valves, and appliances.

3-2.3 Produce a foam fire stream, given foam-producing equipment, so that properly proportioned foam is provided.

(a) *Requisite Knowledge:* Proportioning rates and concentrations, equipment assembly procedures, foam systems limitations, and manufacturer specifications.

(b) *Requisite Skills:* The ability to operate foam proportioning equipment and connect foam stream equipment.

3-2.4 Supply water to fire sprinkler and standpipe systems, given specific system information and a fire department pumper, so that water is supplied to the system at the proper volume and pressure.

(a) *Requisite Knowledge:* Calculation of pump discharge pressure; hose layouts; location of fire department connection; alternative supply procedures if fire department connection is not usable; operating principles of sprinkler systems as defined in NFPA 13, *Standard for the Installation of Sprinkler Systems,* NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes,* and NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height;* fire department operations in sprinklered properties as defined in NFPA 13E, *Guide for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems;* and operating principles of standpipe systems as defined in NFPA 14, *Standard for the Installation of Standpipe and Hose Systems.*

Chapter 4 Apparatus Equipped with an Aerial Device

4-1* General. The requirements of Fire Fighter I as specified in NFPA 1001, *Standard for Fire Fighter Professional Qualifications,* and the job performance requirements defined in Sections 4-1 through 4-2 shall be met prior to certification as a fire department driver/operator—aerial.

4-1.1 Perform the routine tests, inspections, and servicing functions specified in the following list in addition to those specified in the list in 2-2.1, given a fire department aerial apparatus, so that the operational readiness of the aerial apparatus is verified.

- Cable systems (if applicable)
- Aerial device hydraulic systems
- Slides and rollers

- Stabilizing systems
- Aerial device safety systems
- Breathing air systems
- Communication systems

(a) *Requisite Knowledge:* Manufacturer specifications and requirements, policies, and procedures of the jurisdiction.

(b) *Requisite Skills:* The ability to use hand tools, recognize system problems, and correct any deficiency noted according to policies and procedures.

4-1.2* Perform the practical driving exercises specified in 2-3.2 through 2-3.5, given a fire department aerial apparatus and a spotter for backing, so that each exercise is performed safely without striking the vehicle or obstructions.

(a) *Requisite Knowledge:* Vehicle dimensions, turning characteristics, spotter signaling, and principles of safe vehicle operation.

(b) *Requisite Skills:* The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely.

4-1.3* Operate a fire department aerial apparatus over a predetermined route on a public way, given the maneuvers specified in 2-3.1, so that the vehicle is safely operated in compliance with all applicable state and local laws, departmental rules and regulations, and the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, Section 4-2.

(a) *Requisite Knowledge:* The effects on vehicle control of braking reaction time, load factors, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for both roads and bridges; identification and operation of automotive gauges; and proper operation limits.

(b) *Requisite Skills:* The ability to operate passenger restraint devices, maintain safe following distances, maintain control of the vehicle while accelerating, decelerating, and turning, maintain reasonable speed for road, weather, and traffic conditions, operate safely during nonemergency conditions, operate under adverse environmental or driving surface conditions, and use automotive gauges and controls.

4-2 Operations.

4-2.1 Maneuver and position an aerial apparatus, given an aerial apparatus, an incident location, a situation description, and an assignment, so that the apparatus is properly positioned for safe aerial device deployment.

(a) *Requisite Knowledge:* Capabilities and limitations of aerial devices related to reach, tip load, angle of inclination, and angle from chassis axis; effects of topography, ground, and weather conditions on safe deployment; and use of the aerial device.

(b) *Requisite Skills:* The ability to determine the appropriate position for the apparatus, maneuver apparatus into proper position, and avoid obstacles to operations.

4-2.2 Stabilize an aerial apparatus, given a properly positioned vehicle and the manufacturer's recommendations, so that power can be transferred to the aerial device hydraulic system and the device can be safely deployed.

(a) *Requisite Knowledge:* Aerial apparatus hydraulic systems, manufacturer's specifications for stabilization, stabilization requirements, and effects of topography and ground conditions on safe stabilization.

(b) *Requisite Skills:* The ability to transfer power from the vehicle's engine to the hydraulic system and operate vehicle stabilization devices.

4-2.3 Maneuver and position the aerial device from each control station, given an incident location, a situation description, and an assignment, so that the aerial device is properly positioned to safely accomplish the assignment.

(a) *Requisite Knowledge:* Aerial device hydraulic systems, hydraulic pressure relief systems, gauges and controls, cable systems, communications systems, electrical systems, emergency operating systems, locking systems, manual rotation and lowering systems, stabilizing systems, aerial device safety systems, system overrides and the hazards of using overrides, safe operational limitations of the given aerial device, safety procedures specific to the device, and operations near electrical hazards and overhead obstructions.

(b) *Requisite Skills:* The ability to raise, rotate, extend, and position to a specified location and the ability to lock, unlock, retract, lower, and bed the aerial device.

4-2.4 Lower an aerial device using the emergency operating system, given an aerial device, so that the aerial device is safely lowered to its bedded position.

(a) *Requisite Knowledge:* Aerial device hydraulic systems, hydraulic pressure relief systems, gauges and controls, cable systems, communications systems, electrical systems, emergency operating systems, locking systems, manual rotation and lowering systems, stabilizing systems, aerial device safety systems, system overrides and the hazards of using overrides, safe operational limitations of the given aerial device, safety procedures specific to the device, and operations near electrical hazards and overhead obstructions.

(b) *Requisite Skills:* The ability to rotate and position to center, unlock, retract, lower, and bed the aerial device using the emergency operating system.

4-2.5 Deploy and operate an elevated master stream, given a master stream device and a desired flow, so that the stream is effective and the device is operated safely.

(a) *Requisite Knowledge:* Nozzle reaction, range of operation, and weight limitations.

(b) *Requisite Skills:* The ability to connect a water supply to a master stream device and control an elevated nozzle manually or remotely.

Chapter 5 Apparatus Equipped with a Tiller

5-1* General. The requirements of Fire Fighter I as specified in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, and the job performance requirements defined in Chapter 4 and Section 5-2 shall be met prior to certification as a fire department driver/operator—tiller.

5-2 Operations.

5-2.1* Perform the practical driving exercises specified in 2-3.2 through 2-3.5 from the tiller position, given a qualified

driver, a fire department aerial apparatus equipped with a tiller, and a spotter for backing, so that each exercise is performed safely without striking the vehicle or obstructions.

(a) *Requisite Knowledge:* Capabilities and limitations of tiller aerial devices related to reach, tip load, angle of inclination, and angle from chassis axis; effects of topography, ground, and weather conditions on safe deployment; and use of a tiller aerial device.

(b) *Requisite Skills:* The ability to determine the appropriate position for the tiller, maneuver the tiller into proper position, and avoid obstacles to operations.

5-2.2 Operate a fire department aerial apparatus equipped with a tiller from the tiller position over a predetermined route on a public way, using the maneuvers specified in the list in 2-3.1, given a qualified driver, a fire department aerial apparatus equipped with a tiller, and a spotter for backing, so that the vehicle is safely operated in compliance with all applicable state and local laws, departmental rules and regulations, and the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, Section 4-2.

(a) *Requisite Knowledge:* Principles of tiller operation, methods of communication with the driver, the effects on vehicle control of general steering reactions, night driving, negotiating intersections, and manufacturer operation limitations.

(b) *Requisite Skill:* The ability to operate the communication system between the tiller operator's position and the driver's compartment, operate passenger restraint devices, maintain control of the tiller while accelerating, decelerating, and turning, operate the vehicle safely during nonemergency conditions, and operate under adverse environmental or driving surface conditions.

5-2.3 Position a fire department aerial apparatus equipped with a tiller from the tiller position, given the apparatus operating instructions, an incident location, a situation description, and an assignment, so that the aerial device is properly positioned and stabilized to safely accomplish the assignment.

(a) *Requisite Knowledge:* Principles of positioning and stabilizing the aerial apparatus from the tiller position.

(b) *Requisite Skills:* The ability to determine the appropriate position for the tiller, maneuver the tiller into proper position, and avoid obstacles to operations.

Chapter 6 Wildland Fire Apparatus

6-1 General. The job performance requirements defined in Sections 6-1 through 6-2 shall be met prior to certification as a driver/operator—wildland fire apparatus.

6-1.1 Perform the specified routine tests, inspections, and servicing functions specified in the following list, in addition to those contained in 2-2.1, given a wildland fire apparatus and its manufacturer's specifications, so that the operational status is verified.

- Water tank and/or other extinguishing agent levels (if applicable)
- Pumping systems
- Foam systems

(a) *Requisite Knowledge:* Manufacturer specifications and requirements, policies, and procedures of the jurisdiction.

(b) *Requisite Skills:* The ability to use hand tools, recognize system problems, and correct any deficiency noted according to policies and procedures.

6-1.2* Perform the practical driving exercises specified in 2-3.2 through 2-3.5, given a wildland fire apparatus, so that each exercise is performed safely without striking the vehicle or obstructions.

(a) *Requisite Knowledge:* Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signaling, and principles of safe vehicle operation.

(b) *Requisite Skills:* The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely.

6-1.3* Operate a wildland fire apparatus over a predetermined route on a public way that incorporates the maneuvers and features specified in the list in 2-3.1, so that the vehicle is safely operated in compliance with all applicable state and local laws, departmental rules and regulations, and the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, Section 4-2.

(a) *Requisite Knowledge:* The effects on vehicle control of liquid surge, braking reaction time, load factors, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for both roads and bridges; identification and operation of automotive gauges; and proper operation limits.

(b) *Requisite Skills:* The ability to operate passenger restraint devices, maintain safe following distances, maintain control of the vehicle while accelerating, decelerating, and turning, maintain reasonable speed for road, weather, and traffic conditions, operate safely during nonemergency conditions, operate under adverse environmental or driving surface conditions, and use automotive gauges and controls.

6-1.4* Operate a wildland fire apparatus, given a predetermined route off of a public way that incorporates the maneuvers and features specified in the following list that the driver/operator is expected to encounter during normal operations, so that the vehicle is safely operated in compliance with all applicable departmental rules and regulations, the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, Section 4-2, and the design limitations of the vehicle.

- Loose or wet soil
- Steep grades (30 percent fore and aft)
- Limited sight distance
- Blind curve
- Vehicle clearance obstacles (height, width, undercarriage, angle of approach, angle of departure)
- Limited space for turnaround
- Side slopes (20 percent side to side)

(a) *Requisite Knowledge:* The effects on vehicle control of braking reaction time, load factors, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for

both roads and bridges; identification and operation of automotive gauges; and proper operation limits.

(b) *Requisite Skills:* The ability to operate passenger restraint devices, maintain safe following distances, maintain control of the vehicle while accelerating, decelerating, and turning, maintain reasonable speed for road, weather, and traffic conditions, operate safely during nonemergency conditions, operate under adverse environmental or driving surface conditions, and use automotive gauges and controls.

6-2 Operations.

6-2.1* Produce effective fire streams, utilizing the sources specified in the following list, so that the pump is safely engaged, all pressure-control and vehicle safety devices are set, the rated flow of the nozzle is achieved, and the apparatus is continuously monitored for potential problems.

- Water tank
- Pressurized source
- Static source

(a) *Requisite Knowledge:* Hydraulic calculations for friction loss and flow using both written formulas and estimation methods, safe operation of the pump, proper apparatus placement, personal safety considerations, problems related to small-diameter or dead-end mains and low-pressure and private water supply systems, hydrant cooling systems, and reliability of static sources.

(b) *Requisite Skills:* The ability to position a wildland fire apparatus to operate at a fire hydrant and at a static water source, properly place apparatus for fire attack, transfer power from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose lines, nozzles, valves, and appliances.

6-2.2 Pump a supply line, given a relay pumping evolution the length and size of the line and pumping flow and desired intake pressure, so that adequate intake pressures and flow are provided to the next pumper in the relay.

(a) *Requisite Knowledge:* Hydraulic calculations for friction loss and flow using both written formulas and estimation methods, safe operation of the pump, problems related to small-diameter or dead-end main and to low-pressure and private water supply systems, hydrant cooling systems, and reliability of static sources.

(b) *Requisite Skills:* The ability to position a wildland apparatus to operate at a fire hydrant and at a static water source, transfer power from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose lines, nozzles, valves, and appliances.

6-2.3 Produce a foam fire stream, given foam-producing equipment, so that the proper proportion of foam is provided.

(a) *Requisite Knowledge:* Proportioning rates and concentrations, equipment assembly procedures, foam systems limitations, and manufacturer specifications.

(b) *Requisite Skills:* The ability to operate foam proportioning equipment and connect foam stream equipment.

Chapter 7 Aircraft Rescue and Fire-Fighting Apparatus

7-1* General. The requirements of Fire Fighter I as specified in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, and the job performance requirements defined in Sections 7-1 through 7-2 shall be met prior to certification as a fire department driver/operator—aircraft rescue and fire-fighting apparatus (ARFF).

7-1.1 Perform the routine tests, inspections, and servicing functions specified in the following list in addition to those contained in the list in 2-2.1, given an ARFF vehicle and the manufacturer's servicing, testing, and inspection criteria, so that the operational status of the vehicle is verified.

- *Agent dispensing systems
- *Secondary extinguishing systems
- Vehicle-mounted breathing air systems

(a) *Requisite Knowledge:* Manufacturer specifications and requirements, policies, and procedures of the jurisdiction.

(b) *Requisite Skills:* The ability to use hand tools, recognize system problems, and correct any deficiency noted according to policies and procedures.

7-1.2* Perform the practical driving exercises specified in 2-3.1 through 2-3.7, given an ARFF vehicle and a spotter for backing, so that each exercise is performed safely without striking the vehicle or obstructions.

(a) *Requisite Knowledge:* Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signaling, and principles of safe vehicle operation.

(b) *Requisite Skills:* The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely.

7-1.3 Operate an ARFF vehicle, given a predetermined route on an airport that includes the maneuvers listed in the list in 2-3.1, and operation on a taxiway, a runway, and in an aircraft parking area, so that the vehicle is safely operated in compliance with all applicable federal, state/provincial, and local laws, departmental rules and regulations, and the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, Section 4-2.

(a) *Requisite Knowledge:* The effects on vehicle control of liquid surge, braking reaction time, load factors, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for both roads and bridges; identification and operation of automotive gauges; proper operation limits; hazards of driving through smoke; control tower light signals; airfield markings; runway and taxiway designations; air and vehicle traffic patterns; and aircraft parking designations.

(b) *Requisite Skills:* The ability to operate passenger restraint devices, maintain safe following distances, maintain control of the vehicle while accelerating, decelerating, and turning, maintain reasonable speed for road, weather, and traffic conditions, operate safely during nonemergency conditions, operate under adverse environmental or driving surface conditions, and use automotive gauges and controls.

7-1.4* Operate an ARFF apparatus, given a predetermined route, off of an improved surface that incorporates the maneuvers and features specified in the following list that the driver/operator is expected to encounter during normal operations, so that the vehicle is safely operated in compliance with all applicable departmental rules and regulations, the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, Section 4-2, and the design limitations of the vehicle.

- Loose or wet soil
- Steep grades (30 percent fore and aft)
- Limited sight distance
- Vehicle clearance obstacles (height, width, undercarriage)
- Limited space for turnaround
- Side slopes (20 percent side to side)

(a) *Requisite Knowledge:* The effects on vehicle control of braking reaction time, load factors, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for both roads and bridges; identification and operation of automotive gauges; and proper operation limits.

(b) *Requisite Skills:* The ability to operate passenger restraint devices, maintain safe following distances, maintain control of the vehicle while accelerating, decelerating, and turning, maintain reasonable speed for road, weather, and traffic conditions, operate safely during nonemergency conditions, operate under adverse environmental or driving surface conditions, and use automotive gauges and controls.

7-2* Operations.

7-2.1 Maneuver and position an ARFF vehicle, given an incident location and description that involves the largest aircraft that routinely uses the airport, so that the vehicle is properly positioned for safe operation at each operational position for the aircraft.

(a) *Requisite Knowledge:* Vehicle positioning for fire-fighting and rescue operations; capabilities and limitations of turret devices related to reach; and effects of topography, ground, and weather conditions on agent application, distribution rates, and density.

(b) *Requisite Skills:* The ability to determine the appropriate position for the apparatus, maneuver apparatus into proper position, and avoid obstacles to operations.

7-2.2 Produce a fire stream while the vehicle is in both forward and reverse power modulation, given a discharge rate and intended target, so that the pump is safely engaged, the turrets are deployed, the agent is delivered to the intended target at the proper rate, and the apparatus is safely moved and continuously monitored for potential problems.

(a) *Requisite Knowledge:* Principles of agent management and application, effects of terrain and wind on agent application, turret capabilities and limitations, tower light signals, airport markings, aircraft recognition, aircraft danger areas, theoretical critical fire area and practical critical fire area, aircraft entry and egress points, and proper apparatus placement.

(b) *Requisite Skills:* The ability to provide power to the pump, determine the appropriate position for the apparatus, maneuver apparatus into proper position, avoid obstacles to operations, apply agent, and determine the length of time an extinguishing agent will be available.

7-2.3 Produce a fire stream, given a rate of discharge and water supplied from the sources specified in the following list, so that the pump is safely engaged, the turrets are deployed, the agent is delivered to the intended target at the proper rate, and the apparatus is continuously monitored for potential problems.

- The internal tank
- Pressurized source
- Static source

(a) *Requisite Knowledge:* Principles of agent management and application, effects of terrain and wind on agent application, turret capabilities and limitations, tower light signals, airport markings, aircraft recognition, aircraft danger areas, theoretical critical fire area and practical critical fire area, aircraft entry and egress points, and proper apparatus placement.

(b) *Requisite Skills:* The ability to provide power to the pump, determine the appropriate position for the apparatus, maneuver apparatus into proper position, avoid obstacles to operations, apply agent, and determine the length of time an extinguishing agent will be available.

Chapter 8 Mobile Water Supply Apparatus

8-1* General. The requirements of Fire Fighter I as specified in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, and the job performance requirements defined in Sections 8-1 through 8-2 shall be met prior to certification as a fire department driver/operator—mobile water supply apparatus.

8-1.1 Perform routine tests, inspections, and servicing functions specified in the following list, in addition to those specified in the list in 2-2.1, given a fire department mobile water supply apparatus, so that the operational readiness of the mobile water supply apparatus is verified.

- Water tank and other extinguishing agent levels (if applicable)
- Pumping system (if applicable)
- Rapid dump system (if applicable)
- Foam system (if applicable)

(a) *Requisite Knowledge:* Manufacturer specifications and requirements, policies, and procedures of the jurisdiction.

(b) *Requisite Skills:* The ability to use hand tools, recognize system problems, and correct any deficiency noted according to policies and procedures.

8-1.2* Perform the practical driving exercises specified in 2-3.2 through 2-3.5, given a fire department mobile water supply apparatus and a spotter for backing, so that each exercise is performed safely without striking the vehicle or obstructions.

(a) *Requisite Knowledge:* Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signals, and principles of safe vehicle operation.

(b) *Requisite Skills:* The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely.

8-1.3* Operate a fire department mobile water supply apparatus over a predetermined route on a public way, using the maneuvers specified in the list in 2-3.1, so that the vehicle is safely operated in compliance with all applicable state and local laws, department rules and regulations, and the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, Section 4-2.

(a) *Requisite Knowledge:* The effects on vehicle control of liquid surge, braking reaction time, load factors, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for both roads and bridges; identification and operation of automotive gauges; and proper operation limits.

(b) *Requisite Skills:* The ability to operate passenger restraint devices, maintain safe following distances, maintain control of the vehicle while accelerating, decelerating, and turning, maintain reasonable speed for road, weather, and traffic conditions, operate safely during nonemergency conditions, operate under adverse environmental or driving surface conditions, and use automotive gauges and controls.

8-2 Operations.

8-2.1* Maneuver and position a mobile water supply apparatus at a water shuttle fill site, given a fill site location and one or more supply hoses, so that the apparatus is properly positioned, supply hoses are attached to the intake connections without having to stretch additional hose, and no objects are struck at the fill site.

(a) *Requisite Knowledge:* Local procedures for establishing a water shuttle fill site, method for marking the stopping position of the apparatus, and location of the water tank intakes on the apparatus.

(b) *Requisite Skills:* The ability to determine the appropriate position for the apparatus, maneuver apparatus into proper position, and avoid obstacles to operations.

8-2.2* Maneuver and position a mobile water supply apparatus at a water shuttle dump site, given a dump site and a portable water tank, so that all of the water being discharged from the apparatus enters the portable tank and no objects are struck at the dump site.

(a) *Requisite Knowledge:* Local procedures for operating a water shuttle dump site and location of the water tank discharges on the apparatus.

(b) *Requisite Skills:* The ability to determine the appropriate position for the apparatus, maneuver apparatus into proper position, avoid obstacles to operations, and operate the fire pump or rapid water dump system.

8-2.3* Establish a water shuttle dump site, given two or more portable water tanks, low-level strainers, water transfer equipment, fire hose, and a fire apparatus equipped with a fire pump, so that the tank being drafted from is kept full at all times, the tank being dumped into is emptied first, and the water is transferred efficiently from one tank to the next.

(a) *Requisite Knowledge:* Local procedures for establishing a water shuttle dump site and principles of water transfer between multiple portable water tanks.

(b) *Requisite Skills:* The ability to deploy portable water tanks, connect and operate water transfer equipment, and connect a strainer and suction hose to the fire pump.

Chapter 9 Referenced Publications

9-1 The following documents or portions thereof are referenced within this standard as mandatory requirements and shall be considered part of the requirements of this standard. The edition indicated for each referenced mandatory document is the current edition as of the date of the NFPA issuance of this standard. Some of these mandatory documents might also be referenced in this standard for specific informational purposes and, therefore, are also listed in Appendix B.

9-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1996 edition.

NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, 1996 edition.

NFPA 13E, *Guide for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems*, 1995 edition.

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, 1996 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 1996 edition.

NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, 1997 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 1997 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus*, 1996 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-1-2 The purpose of this standard is not to mandate that all fire apparatus driver/operators meet the requirements of all chapters of this standard. Personnel should meet only those provisions that pertain to the types of apparatus they will be expected to drive and operate.

A-1-3.2 Although the frequency of the medical evaluation is not specified, it is recommended that the medical evaluation be made on at least an annual basis.

A-1-3.3 It is the committee's intent that this standard be applied to all fire department vehicles. Drivers of vehicles not specifically addressed in Chapters 3 through 8 (e.g., staff or command vehicles, rescue or utility vehicles, and buses) are expected to meet the requirements of Chapter 2. Agencies operating unique or special vehicles (e.g., tractors, bulldozers, cranes, and graders) should develop job performance requirements and training programs for those vehicles.

A-1-3.10 It is recommended that evaluators be individuals who were not directly involved as instructors for the requirement being evaluated.

A-1-3.13 The maneuvers and features specified for this job performance requirement include driving situations that the committee has determined to be essential. The committee recognizes that each of these situations might not exist in all areas. Where this occurs, those specific requirements can be omitted. It should not be assumed that all these vehicles are wheel drive.

A-1-4 Action verbs used in the job performance requirements in this document are based on the first definition of the verb found in *Webster's Third New International Dictionary of the English Language.*

A-1-4 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A-1-4 Authority Having Jurisdiction. The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A-1-4 Wildland Fire Apparatus. These vehicles are expected to operate on a wide variety of surfaces, including off-road. They are equipped with fixed or portable pumps used to supply attack lines; however, these pumps are generally of a capacity that does not put the vehicle into the classification of attack or fire pump.

A-2-2.1 Routine tests, inspections, and servicing functions should be performed on a daily, weekly, monthly, or other periodic basis as determined by departmental policy. The specifications provided by the manufacturer for these functions should be followed.

A-2-3.1 The maneuvers and features specified for this job performance requirement include driving situations that the committee has determined to be essential. The committee recognizes that each of these situations might not exist in all areas. Where this occurs, those specific requirements can be omitted.

A-2-3.2 The alley dock exercise can be used as practice for or in the evaluation of this requirement. This exercise measures a driver's ability to drive past a simulated dock or stall, back the apparatus into the space provided, and stop smoothly. A dock or stall can be simulated by arranging barricades 40 ft (12.2 m) from a boundary line. These barricades should be 12 ft (3.66 m) apart, and the length should be approximately 20 ft (6.1 m). The driver should pass the barricades with the dock on the left and then back the apparatus, using a left turn, into the stall. The exercise should then be repeated with the dock on the right side, using a right turn. *[See Figure A-2-3.2(a).]*

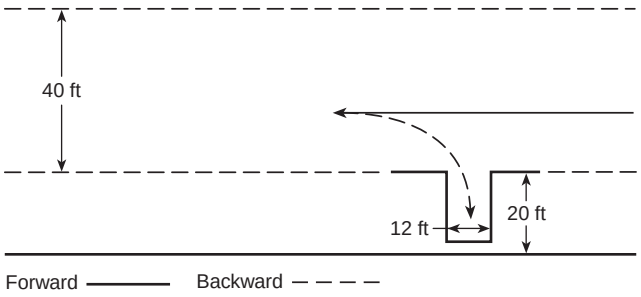

Figure A-2-3.2(a) Alley dock exercise.

The apparatus station parking maneuver can also be used as practice for or in the evaluation of this requirement. This exercise measures the driver's ability to back the apparatus into a fire station to park or to back the apparatus down a street to reverse the direction of travel. An engine bay can be simulated by allowing for a 20-ft (6.1-m) minimum setback from a street 30 ft (9 m) wide, with a set of barricades at the end of the setback, spaced 12 ft (3.66 m) apart to simulate the garage door. The setback from the street should be determined by the testing agency to ensure that the distances reflect those encountered by the apparatus driver during the normal course of duties. A marker placed on the ground should indicate to the operator the proper position of the left front tire of the vehicle once stopped and parked. A straight line can be provided to assist the operator while backing the apparatus, facilitating the use of vehicle mirrors. The minimum depth distance is determined by the total length of the vehicle. *[See Figure A-2-3.2(b).]*

NOTE: For large vehicles, such as ARFF apparatus, this course might need to be modified.

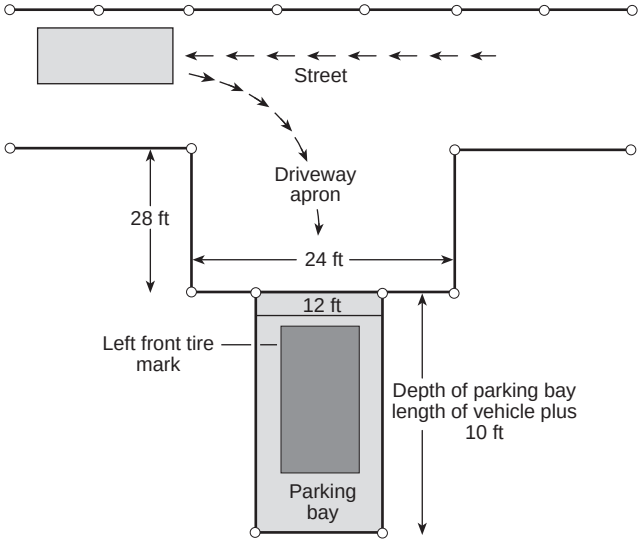

Figure A-2-3.2(b) Station parking procedure drill.

A-2-3.3 The serpentine exercise can be used as practice for or in the evaluation of this requirement. This exercise measures a driver's ability to steer the apparatus in close limits without stopping. The exercise should be conducted with the apparatus moving first backward, then forward. The course or path of travel for this exercise can be established by placing a minimum of three markers, each spaced between 30 ft (9 m) and 38 ft (12 m) apart, in a line. The spacing of the markers should be based on the wheel base of the vehicle used. Adequate space must be provided on each side of the markers for the apparatus to move freely. The driver should drive the apparatus along the left side of the markers in a straight line and stop just beyond the last marker. The driver then should back the apparatus between the markers by passing to the left of marker No. 1, to the right of marker No. 2, and to the left of marker No. 3. At this point, the driver should stop the vehicle and then drive it forward between the markers by passing to the right of marker No. 3, to the left of marker No. 2, and to the right of marker No. 1. *(See Figure A-2-3.3.)*

NOTE: For large vehicles, such as ARFF apparatus, this course might need to be modified.

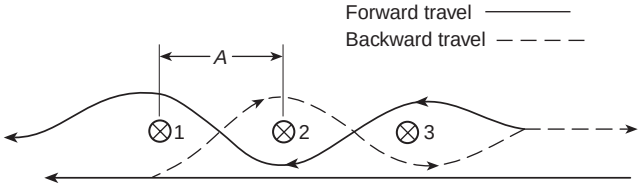

Figure A-2-3.3 Serpentine exercise.

A-2-3.4 The confined space turnaround can be used as practice for or in the evaluation of this requirement. This exercise measures the driver's ability to turn the vehicle around in a confined space without striking obstacles. The turn is accomplished within an area 50 ft × 100 ft (15.25 m × 30.5 m). The driver moves into the area from a 12-ft (3.66-m) opening in the center of one of the 50-ft (15.25-m) legs, turns the vehicle 180 degrees, and returns through the opening. There is no limitation on the number of times the driver has to maneuver the vehicle to accomplish this exercise, but no portion of the vehicle should extend over the boundary lines of the space. *(See Figure A-2-3.4.)*

NOTE: For large vehicles, such as ARFF apparatus, this course might need to be modified.

A-2-3.5 The diminishing clearance exercise can be used as practice for or in the evaluation of this requirement. This exercise measures a driver's ability to steer the apparatus in a straight line, to judge distances from wheel to object, and to stop at a finish line. The speed at which a driver should operate the apparatus is optional, but it should be great enough to necessitate quick judgment. This exercise is to be performed both forward and in reverse with a spotter. The course for this exercise is created by arranging two rows of markers to form a lane 75 ft (22.9 m) long. The lane varies in width from 9 ft 6 in. (2.9 m) to a diminishing clearance of 8 ft 2 in. (2.5 m). The driver should maneuver the apparatus through this lane without touching the markers. The vehicle should be stopped at a finish line 50 ft (15.25 m) beyond the last marker. No portion of the vehicle should protrude beyond this line. Vertical clearance judgment should be evaluated

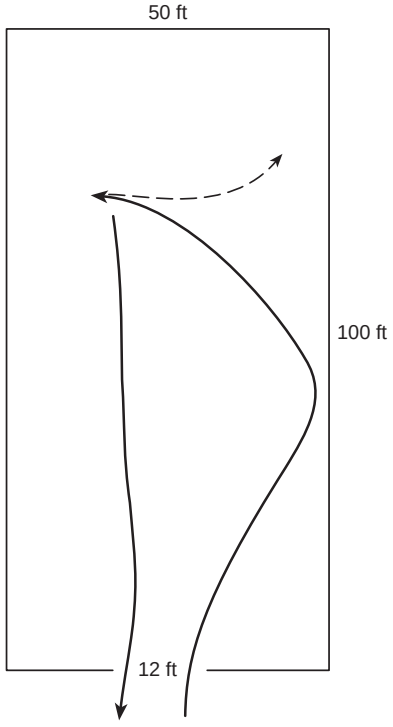

Figure A-2-3.4 Confined space turnaround.

using a prop with a crossbar that is adjustable, based on the vehicle height. During the evaluation, the driver should drive forward and back through the prop with the crossbar at several differing heights, including one that is lower than the top of the vehicle. The prop should not be struck. The intent of the vertical clearance judgment is for proper identification of the furthermost point in the form of the apparatus. In situations where the apparatus is gaining entry to roadways or limited-height areas, the driver/operator must allow appropriate space ahead of the apparatus in order to avoid striking objects or to avoid extending apparatus into traffic lanes. *(See Figure A-2-3.5.)*

NOTE: For large vehicles, such as ARFF apparatus, this course might need to be modified.

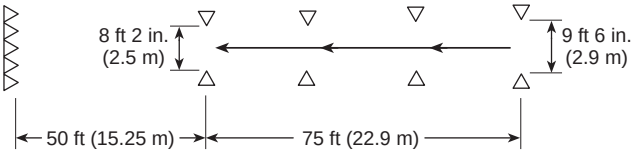

Figure A-2-3.5 Diminishing clearance exercise.

A-2-3.6 Emergency driving simulation should be restricted to a driving track or similar controlled area. Emergency driver training should not be conducted on public ways. For more information, see Title 49, *Code of Federal Regulations*, Part 383, ''Commercial Driver's License Standards: Requirements and Penalties,'' Section 383.110.

A-2-3.7 The committee's intent for this job performance is for the driver/operator to be able to operate all major equip-

ment and mechanical systems that are attached to the apparatus, other than those specifically covered in Chapters 3 through 8 of this standard. These types of equipment and systems include, but are not limited to, electric generation equipment, flood-lighting systems, air compressors, air cascade systems, hydraulic rescue tool systems, power reels for air or hydraulic hoses, cranes and stabilizers, and A-frames or other lifting equipment.

A-3-1 The requirements of Chapters 3, 4, 5, and 7 specify that the candidate shall meet the requirements of Fire Fighter I as specified in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, before certification as a fire apparatus driver/operator. This means that the individual applying for certification as a fire apparatus driver/operator has met all of the objectives in Chapters 1, 2, and 3 of NFPA 1001. These objectives include further requirements in areas such as fire hose, nozzles, and appliances, fire streams, water supplies, and sprinklers. These requirements are in addition to the requirements of this standard. Any fire fighter who has already been certified as a Fire Fighter I should review the requirements of the referenced chapters of NFPA 1001, as the candidate can be tested on the requirements included therein.

A-3-1.2 See A-2-3.2 through A-2-3.5.

A-3-1.3 The hydrant or water source spotting exercise can be used as practice for or in the evaluation of this requirement. This exercise measures the driver's ability to spot the pumper at a hydrant for pumping operations that require the soft or the hard intake hose to be hooked from the pumper connections to the water source.

A hydrant located along a street utilizing a set of barricades set 15 ft (4.6 m) on each side of the hydrant to simulate parked vehicles can be used. The driver should be able to position the pumper and complete the hydrant to pump connections on the left side, right side, and front or rear (if so configured) without having kinks in the soft intake hose, without moving the barricades, or without repositioning the pumper.

A rural scenario would require that the driver position the pumper to a portable water tank and deploy a hard intake hose from the left, right, and front or rear (if applicable) pump connections.

An additional rural scenario would require the driver to position the pumper to perform drafting operations from a pond, lake, or stream. *(See A-2-3.1.)*

A-3-2.1 Pressurized sources include the following:

(a) Connection to a hydrant
(b) Supply line from another pumping source

A-4-1 See A-3-1.

A-4-1.2 See A-2-3.3 through A-2-3.6.

A-4-1.3 See A-2-3.1.

A-5-1 See A-3-1.

A-5-2.1 See A-2-3.3 through A-2-3.6.

A-6-1.2 See A-2-3.3 through A-2-3.6.

A-6-1.3 See A-2-3.1.

A-6-1.4 See A-2-3.1.

A-6-2.1 Pressurized sources include the following:

(a) Connection to a hydrant
(b) Supply line from another pumping source

A-7-1 See A-3-1.

A-7-1.1 An agent dispensing system is the primary fire suppression agent carried on ARFF vehicles and usually is aqueous film-forming foam (AFFF).

A secondary extinguishing system is a separate system, totally independent of the primary. It includes Halon 1211 (its future replacement), dry chemical, and other such systems used for specific types of aircraft associated fires.

A-7-1.2 See A-2-3.2 through A-2-3.5.

A-7-1.4 See A-2-3.1.

A-7-2 Pressurized sources include the following:

(a) Connection to a hydrant
(b) Supply line from another pumping source

A-8-1 See A-3-1.

A-8-1.2 See A-2-3.3 through A-2-3.6.

A-8-1.3 See A-2-3.1.

A-8-2.1 The intent of this requirement is for the driver/operator to be able to quickly and efficiently position the vehicle at a water shuttle fill site that has been established prior to the vehicle's arrival. Most commonly a fire department pumper will connect to a water supply source and lay hose out that can be quickly attached to the mobile water supply apparatus once it arrives at the fill site. If the jurisdiction operates their fill site operations in a different manner than the one described, this requirement might need to be adjusted accordingly.

A-8-2.2 The intent of this requirement is for the driver/operator to be able to quickly and efficiently position the vehicle at a water shuttle dump site that has been established prior to the vehicle's arrival. The dump site will typically consist of one or more portable tanks that have been deployed on the ground. A fire department pumper drafts water from the portable tanks for use on the incident. The mobile water supply apparatus' function is to quickly dump their load into the portable tank and return to the fill site for another load. Depending on the design of the mobile water supply apparatus, one of three methods can be used to discharge water into the portable water tank. These methods include pumping the water off, using a gravity dump, or using a jet-assisted gravity dump. Depending on the design of the apparatus, water can be discharged from the front, rear, or either side of the vehicle.

A-8-2.3 A proper dump site involves the use of two or more portable tanks that are connected by a series of water transfer equipment. The water transfer equipment can be supplied by hoselines from the pumper that is supplying the fire scene or a second pumper placed at the drafting tank for the sole purpose of transferring water between the tanks. The goal is to keep the tank from which water is being drafted full at all times and the tank from which water is being dumped empty. This will ensure that mobile water supply apparatus that arrive at the dump site can unload their water and return for more in the shortest time possible.

Appendix B Referenced Publications

B-1 The following documents or portions thereof are referenced within this standard for informational purposes only and are thus not considered part of the requirements of this standard unless also listed in Chapter 9. The edition indicated

here for each reference is the current edition as of the date of the NFPA issuance of this standard.

B-1.1 NFPA Publication. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, 1997 edition.

B-1.2 U.S. Government Publication. U.S. Government Printing Office, Washington, D.C. 20402.

Title 49, *Code of Federal Regulations,* Part 383, ''Commercial Driver's License Standards: Requirements and Penalties,'' 383.110:29.

B-1.3 Other Publication. *Webster's Third New International Dictionary of the English Language.*

Appendix C Job Performance Requirements

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

C-1 Explanation of the Standards and Concepts of Job Performance Requirements (JPRs). The primary benefit of establishing national professional qualification standards is to provide both public and private sectors with a framework of the job requirements for the fire service. Other benefits include enhancement of the profession, individual as well as organizational growth and development, and standardization of practices.

NFPA professional qualification standards identify the minimum JPRs for specific fire service positions. The standards can be used for training design and evaluation, certification, measuring and critiquing on-the-job performance, defining hiring practices, and setting organizational policies, procedures, and goals. (Other applications are encouraged.)

Professional qualification standards for a specific job are organized by major areas of responsibility defined as duties. For example, the fire fighter's duties might include fire suppression, rescue, and water supply, and the public fire educator's duties might include education, planning and development, and administration. Duties are major functional areas of responsibility within a job.

The professional qualification standards are written as JPRs. JPRs describe the performance required for a specific job. JPRs are grouped according to the duties of a job. The complete list of JPRs for each duty defines what an individual must be able to do in order to successfully perform that duty. Together, the duties and their JPRs define the job parameters; that is, the professional qualification standard as a whole is a job description.

C-2 Breaking Down the Components of a JPR. The JPR is the assembly of three critical components. *(See Table C-2.)* These components are as follows:

(a) Task that is to be performed
(b) Tools, equipment, or materials that must be provided to successfully complete the task
(c) Evaluation parameters and/or performance outcomes

The task to be performed. The first component is a concise statement of what the person is supposed to do.

Tools, equipment, or materials that must be provided to successfully complete the task. This component ensures that all individuals completing the task are given the same minimal tools, equipment, or materials when being evaluated. By listing these items, the performer and evaluator know what must be provided in order to complete the task.

Evaluation parameters and/or performance outcomes. This component defines how well one must perform each task—for both the performer and the evaluator. The JPRs guide performance towards successful completion by identifying evaluation parameters and/or performance outcomes. This portion of the JPRs promotes consistency in evaluation by reducing the variables used to gauge performance.

Table C-2 Example of a JPR

(a) Task	(a) Establish a water shuttle dump site
(b) Tools, equipment, or materials	(b) Given two or more portable water tanks, low-level strainers, water transfer equipment, fire hose, and a fire apparatus equipped with a water pump
(c) Evaluation parameters and performance outcomes	(c) So that the tank being drafted from is kept full at all times, the tank being dumped into is emptied first, and water is transferred efficiently from one tank to the next

In addition to these three components, the JPRs contain requisite knowledge and skills. Just as the term requisite suggests, these are the necessary knowledge and skills one must have prior to being able to perform the task. Requisite knowledge and skills are the foundation for task performance.

Once the components and requisites are put together, the JPRs might read as follows.

Example: Establish a water shuttle dump site, given two or more portable water tanks, low-level strainers, water transfer equipment, fire hose, and a fire apparatus equipped with a fire pump, so that the tank being drafted from is kept full at all times, the tank being dumped into is emptied first, and water is transferred efficiently from one tank to the next.

(a) *Requisite Knowledge:* Local procedures for establishing a water shuttle dump site and principles of water transfer between multiple portable water tanks.
(b) *Requisite Skills:* The ability to deploy portable water tanks, connect and operate water transfer equipment, and connect a strainer and suction hose to the fire pump.

C-3 Examples of Potential Uses. *Certification.* JPRs can be used to establish the evaluation criteria for certification at a specific job level. When used for certification, evaluation must be based on the successful completion of JPRs.

First, the evaluator would verify the attainment of requisite knowledge and skills prior to JPRs evaluation. This might be through documentation review or testing.

Next, the candidate would then be evaluated on completing the JPRs. The candidate would perform the task and be evaluated based on the evaluation parameters and/or performance outcomes. This performance-based evaluation can be either practical (for psychomotor skills such as ''ventilate a roof'') or written (for cognitive skills such as ''interpret burn patterns'').

NOTE: Psychomotor skills are those physical skills that can be demonstrated or observed. Cognitive skills (or mental skills) cannot be observed but are evaluated on how one completes the task (process oriented) or on the task outcome (product oriented).

Using the previous example, a practical performance-based evaluation would measure the ability to ''establish a water shuttle dump site.'' The candidate passes this particular evaluation if the standard was met—that is, the tank being drafted from is kept full at all times, the tank being dumped into is

emptied first, and water is transferred efficiently from one tank to another.

It is important to remember that when a candidate is being evaluated, he or she must be given the tools, equipment, or materials listed in the JPRs (e.g., a portable tank, a low-level strainer, fire hose, and a fire apparatus equipped with a water pump) before he or she can be properly evaluated.

C-4 Curriculum Development/Training Design and Evaluation. The statements contained in this document that refer to job performance were designed and written as JPRs. While a resemblance to instructional objectives might be present, these statements should not be used in a teaching situation until after they have been modified for instructional use.

JPRs state the behaviors required to perform specific skill(s) on the job as opposed to a learning situation. These statements should be converted into instructional objectives with behaviors, conditions, and standards that can be measured within the teaching/learning environment. A JPR that requires a driver/operator to ''establish a water shuttle dump site'' should be converted into a measurable instructional objective for use when teaching the skill. *[See Figure C-4(a).]*

In the previous example, the JPR requiring a driver/operator to establish a water shuttle dump site should be converted into a measurable instructional objective for use when teaching the task. Using the example, a terminal instructional objective might read as follows.

The candidate will establish a water shuttle dump site, given two or more portable water tanks, low-level strainers, water transfer equipment, fire hose, and a fire apparatus equipped with a fire pump, so that 100 percent accuracy is attained on a skills checklist. (At a minimum, the skills checklist should include each of the measurement criteria from the JPR.)

Figure C-4(b) is a sample checklist for use in evaluating this objective.

While the differences between job performance requirements and instructional objectives are subtle in appearance, the purpose of each statement differs greatly. JPRs state what is necessary to perform the job in the ''real world.'' Instructional objectives, however, are used to identify what students must

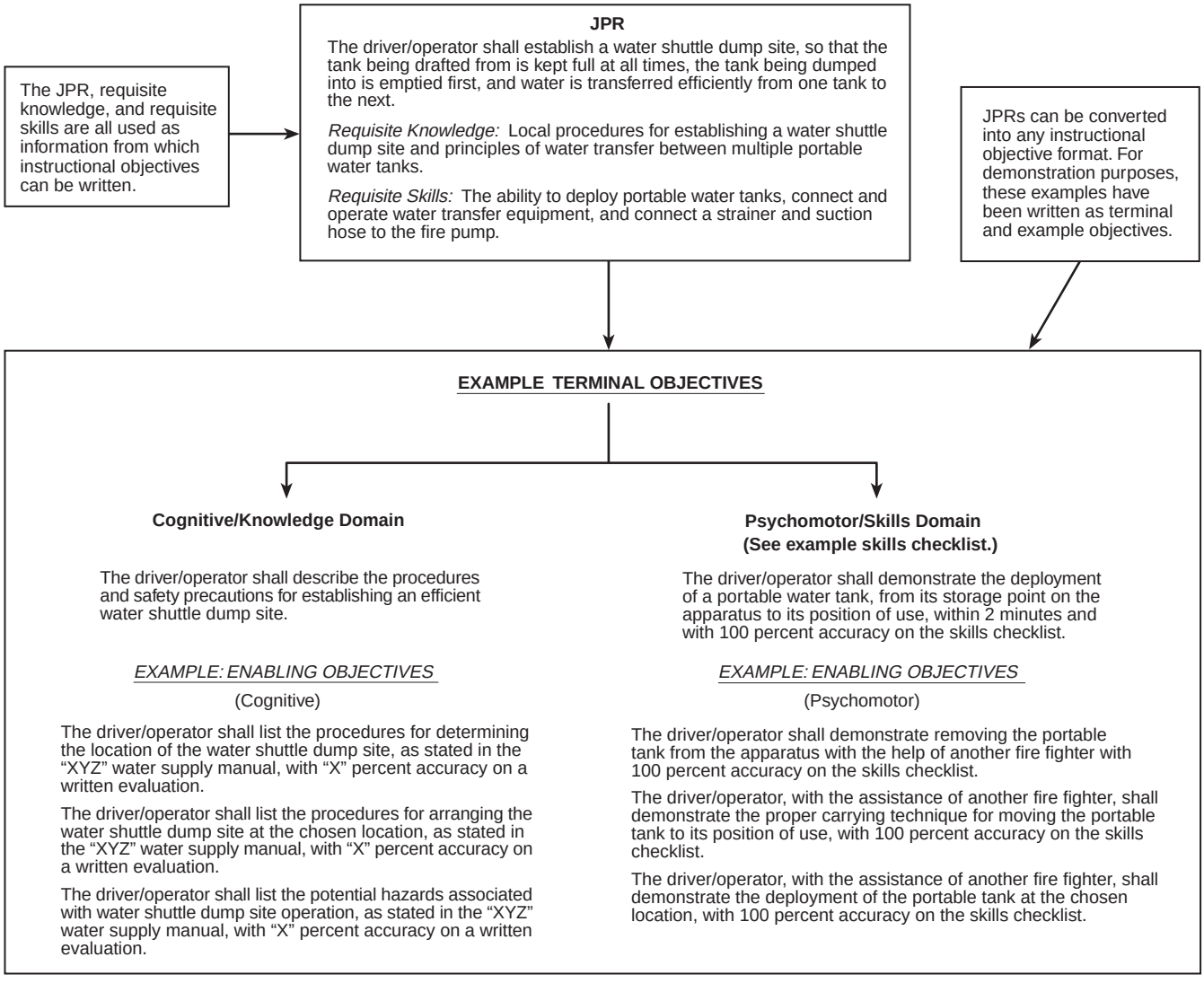

Figure C-4(a) Converting JPRs into instructional objectives.