NFPA 1081

Standard for Industrial Fire Brigade Member Professional Qualifications

2001 Edition

NFPA, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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This edition of NFPA 1081, *Standard for Industrial Fire Brigade Member Professional Qualifications*, was prepared by the Technical Committee on Industrial Fire Brigades Professional Qualifications, released by the Technical Correlating Committee on Professional Qualifications, and acted on by NFPA at its May Association Technical Meeting held May 13–17, 2001, in Anaheim, CA. It was issued by the Standards Council on July 13, 2001, with an effective date of August 2, 2001.

This edition of NFPA 1081 was approved as an American National Standard on August 2, 2001.

Origin and Development of NFPA 1081

In 1996, the NFPA Standards Council, after receipt of a request for the development of a standard for the professional qualifications of industrial fire brigade members, approved the establishment of a Technical Committee on Industrial Fire Brigades Member Professional Qualifications under the Professional Qualifications project. The purpose of the document was to develop requirements for personnel who perform as members of organized industrial fire brigades at specific sites or facilities. An organizational meeting of the new committee was held in October 1997 in Tampa, FL. The technical committee met a total of eight times during the development of this document.

The development process was coordinated with other professional qualifications documents and with the Technical Committee on Loss Prevention Procedures and Practices, the committee responsible for NFPA 600, *Standard on Industrial Fire Brigades*. To accommodate the site-specific needs of industrial fire brigades at various locations, the committee developed a core set of job performance requirements, as well as site-specific requirements for each defined level in the document. The intent is that the management of a facility utilizing the requirements of NFPA 1081 would identify those site-specific requirements applicable to the facility and incorporate them into the requirements for their industrial fire brigade members. This departure from the traditional style of other professional qualifications documents was necessary in order to track with the NFPA 600 and OSHA requirements in 29 CFR 1910.156 for fire brigades.

The first edition of NFPA 1081, *Standard for Industrial Fire Brigade Member Professional Qualifications*, adopted at the May 2001 meeting of the National Fire Protection Association, establishes job performance requirements for the levels of industrial fire brigade operations defined in NFPA 600: Incipient, Advanced Exterior, and Interior Structural. Requirements for the position of Fire Brigade Leader are also provided in the document.

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These lists represent the membership at the time the Committees were balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the 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.

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

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. The complete title and edition of the document the material is extracted from is found in Annex E. Editorial changes to extracted material consist of revising references to an appropriate division in this document or the inclusion of the document number with the division number when the reference is to the original document. Requests for interpretations or revisions of extracted text shall be sent to the appropriate technical committee.

Information on referenced publications can be found in Chapter 2 and Annex E.

Chapter 1 Administration

1.1* Scope. This standard identifies the minimum job performance requirements necessary to perform the duties of an individual who is a member of an organized industrial fire brigade providing services at a specific facility or site.

1.2 Purpose. The purpose of this standard is to specify the minimum job performance requirements for industrial fire brigade members. It is not the intent of the standard to restrict any jurisdiction from exceeding these requirements.

1.3 Application.

1.3.1* The job performance requirements found in Chapters 5 through 8 are not required to be mastered in the order they appear. The management of the industrial fire brigade shall establish instructional priority and the training program content to prepare individuals to meet the job performance requirements of this standard.

1.3.2 Wherever in this standard the terms *rules, regulations, procedures, supplies, apparatus*, or *equipment* are referred to, it is implied that they are those of the management of the industrial fire brigade.

1.4 Units and Formulas. In this standard, values for measurement are followed by an equivalent in U.S. units, but only the first stated value shall be regarded as the requirement. Equivalent values are not considered as the requirement, as these values can be approximate. *(See Table 1.4.)*

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

Table 1.4 SI Conversions

Quantity	SI Unit/Symbol	U.S. Unit/Symbol	Conversion Factor
Length	millimeter (mm)	inch (in.)	25.4 mm = 1 in.
	meter (m)	foot (ft)	0.305 m = 1 ft
Area	square meter (m^2)	square foot (ft^2)	0.0929 m^2 = 1 ft^2
Volume	liters per minute (L/min)	gallons per minute (gpm)	3.78 L/min = 1 gpm
Pressure	newtons/meter^2 (N/m^2)	pounds per square inch (psi)	0.345 N/m^2 = 1 psi

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

NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents,* 1997 edition.

NFPA 600, *Standard on Industrial Fire Brigades,* 2000 edition.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications,* 1998 edition.

2.1.2 Other Publications. (Reserved)

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not included, common usage of the terms shall apply.

3.2 Official NFPA Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.3 General Definitions.

3.3.1 Certification. Attests authoritatively; specifically, the issuance of a document that states that one has demonstrated the knowledge and skills necessary to function in a field. [**1000**:2]

3.3.2 Drill. An exercise involving a credible simulated emergency that requires personnel to perform emergency operations for the purpose of evaluating the effectiveness of the training and education programs and the competence of personnel in performing required duties and functions. [**600**:1.5]

3.3.3 Emergency Response Operations. Activities related to emergency incidents, including response to the scene of the incident and specific duties performed at the scene.

3.3.4 Enclosed Structure. A structure with a roof or ceiling and at least two walls that can present fire hazards to employees such as accumulations of smoke, toxic gases, and heat, similar to those found in buildings. [**600**:1.5]

3.3.5 Facility. A structure or building located on a site that serves a particular purpose.

3.3.6 Fire Fighting.

3.3.6.1* Advanced Exterior Fire Fighting. Offensive fire fighting performed outside of an enclosed structure when the fire is beyond the incipient stage. *(See also Incipient Stage.)* [**600**:1.5]

3.3.6.2 Defensive Fire Fighting. The mode of manual fire control in which the only fire suppression activities taken are limited to those required to keep a fire from extending from one area to another. [**600**:1.5]

3.3.6.3 Incipient Fire Fighting. Fire fighting performed inside or outside of an enclosed structure or building when the fire has not progressed beyond incipient stage. [**600**:1.5]

3.3.6.4* Interior Structural Fire Fighting. The physical activity of fire suppression, rescue, or both, inside of buildings or enclosed structures that are involved in a fire situation beyond the incipient stage. [**600**:1.5]

3.3.6.5 Offensive Fire Fighting. The mode of manual fire control in which manual fire suppression activities are concentrated on reducing the size of a fire to accomplish extinguishment. [**600**:1.5]

3.3.6.6 Structural Fire Fighting. The activities of rescuing, fire suppression, and property conservation involving buildings, enclosed structures, vehicles, vessels, or like properties that are involved in a fire or emergency situation. [**1500**:1.5]

3.3.7 Incident Management System. The management system or command structure used during emergency response operations to clearly identify who is in command of the incident and what roles and responsibilities are assigned to various members. [**1670**:1.3]

3.3.8 Incipient Stage. Refers to the severity of a fire where the progression is in the early stage and has not developed beyond that which can be extinguished using portable fire extinguishers or handlines flowing up to 473 L/min (125 gpm). A fire is considered to be beyond the incipient stage when the use of thermal protective clothing or self-contained breathing apparatus is required or an industrial fire brigade member is required to crawl on the ground or floor to stay below smoke and heat. [**600**:1.5]

3.3.9 Industrial Fire Brigade. An organized group of employees within an industrial occupancy who are knowledgeable, trained, and skilled in at least basic fire fighting operations, and whose full-time occupation might or might not be the provision of fire suppression and related activities for their employer. [**600**:1.5]

3.3.10 Industrial Fire Brigade Apparatus. An industrial fire brigade emergency response vehicle designed and intended primarily for fire suppression, rescue, or other specialized function. This apparatus includes pumpers, foam apparatus, aerial ladders, rescue vehicles, and other such apparatus. [**600**:1.5]

3.3.11 Industrial Fire Brigade Leader. An individual responsible for overseeing the performance or activity of other members.

3.3.12 Industrial Fire Brigade Management. The individual designated by top management as being responsible for the organization, management, and functions of the industrial fire brigade. [**600**:1.5]

3.3.13 Industrial Fire Brigade Training Coordinator. The designated company representative with responsibility for coordinating effective, consistent, and quality training within the industrial fire brigade training and education program. [**600**:1.5]

3.3.14 Job Performance Requirement (JPR). 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. [**1000**:2]

3.3.15 Personal Protective Equipment (PPE). Consists of full thermal protective clothing, plus a self-contained breathing apparatus (SCBA) and a personal alert safety system (PASS) device.

3.3.16 Pre-Incident Plan. A written document resulting from the gathering of general and detailed data to be used by responding personnel for determining the resources and actions necessary to mitigate anticipated emergencies at a specific facility. [**1620**:1.3]

3.3.17 Procedure. The series of actions, conducted in an approved manner and sequence, designed to achieve an intended outcome.

3.3.18 Requisite Knowledge. Fundamental knowledge one must have in order to perform a specific task. [**1031**:2.1]

3.3.19 Requisite Skills. The essential skills one must have in order to perform a specific task. [**1031**:2.1]

3.3.20 Safely. To perform a job performance requirement without risk of injury to self or to others.

3.3.21 Site. The entire premises within the governed property lines that contains one or more facilities.

3.3.22 Site-Specific Hazard. A hazard that is present at the specific facility for which the industrial fire brigade has been organized. [**600**:1.5]

3.3.23 Standard Operating Procedure (SOP). A written procedure that establishes a standard course of action and documents the functional limitations of the fire brigade members in performing emergency operations. [**600**:1.5]

3.3.24* Support Member. Personnel assigned to the industrial fire brigade to perform specific duties, including those people who have specific technical knowledge or skills or who have been given specific assignments that indirectly support manual fire suppression efforts. [**600**:1.5]

3.3.25 Task. A specific job behavior or activity. [**1002**:1.4]

3.3.26 Team. Two or more individuals who have been assigned a common task and are in communication with each other, coordinate their activities as a work group, and support the safety of one another.

3.3.27* Thermal Protective Clothing. Protective clothing such as helmets, footwear, gloves, hoods, trousers, and coats that are designed and manufactured to protect the industrial fire brigade member from the adverse effects of fire. [**600**:1.5]

3.3.28 Zone.

3.3.28.1 Cold Zone. The safe area immediately surrounding and outside the boundary of the established warm zone of a fire. Personnel positioned in the cold zone are safe from the adverse effects of a fire. [**600**:1.5]

3.3.28.2 Hot Zone. The area immediately surrounding the physical location of a fire. The outer boundary of the hot zone extends far enough from the fire to protect industrial fire brigade members positioned outside the hot zone from being directly exposed to flames, dense smoke, or extreme temperatures. [**600**:1.5]

3.3.28.3 Warm Zone. The control area immediately surrounding and outside the boundary of the established hot zone of a fire. The outer boundary of the warm zone extends far enough from the outer boundary of the hot zone to protect personnel positioned outside the warm zone from the adverse effects of the fire. [**600**:1.5]

Chapter 4 Entrance Requirements

4.1* General. Prior to entering training to meet the requirements of Chapters 5 through 8, the candidate shall meet the entrance and educational requirements established by the management of the industrial fire brigade and the medical- and job-related physical requirements established by NFPA 600, *Standard on Industrial Fire Brigades*.

4.2* Emergency Medical Care. The emergency medical care performance capabilities for industrial fire brigade personnel shall be determined and validated by the management of the industrial fire brigade.

4.3 Job Performance Requirements. The job performance requirements shall be accomplished in accordance with the requirements of the management of the industrial fire brigade and NFPA 600, *Standard on Industrial Fire Brigades*.

4.3.1* In addition to the requirements defined in Chapters 5 through 8, the management of the industrial fire brigade shall define the site-specific requirements for each level of industrial fire brigade membership that are applicable to its employees and shall include those requirements in the evaluation of the employee at the applicable level. The process used to identify the site-specific requirements for a site or facility shall be documented.

4.3.2* Performance of each requirement of this standard shall be evaluated by individuals approved by the management of the industrial fire brigade.

4.3.3 The entrance requirements of Chapter 4 shall be met prior to beginning training at the incipient level.

4.3.4* Prior to being qualified or certified at the incipient level, the candidate shall meet the job performance requirements defined in Chapter 5, Sections 5.1 and 5.2, and the applicable site-specific requirements in Section 5.3 as defined by the management of the industrial fire brigade.

4.3.4.1 The incipient level is the first level of progression for the subsequent levels of progression in this standard.

4.3.5 Prior to being qualified or certified at the advanced exterior level, the industrial fire brigade member shall meet the job performance requirements of Chapter 5, Sections 5.1 and 5.2, and Chapter 6, Sections 6.1 and 6.2, and the applicable site-specific requirements in Sections 5.3 and 6.3 as defined by the management of the industrial fire brigade.

4.3.6 Prior to being qualified or certified at the interior structural level, the industrial fire brigade member shall meet the job performance requirements of Chapter 5, Sections 5.1 and 5.2, and Chapter 7, Sections 7.1 and 7.2, and the applicable site-specific requirements in Sections 5.3 and 7.3 as defined by the management of the industrial fire brigade.

4.3.7 Prior to being qualified or certified at the interior structural/advanced exterior level, the industrial fire brigade member shall meet the job performance requirements of Chapters 5, 6, and 7 and the applicable site-specific requirements as defined by the management of the industrial fire brigade.

4.3.8 Prior to being qualified or certified at the fire brigade leader level, the industrial fire brigade member shall meet the job performance requirements of Chapters 5, 6, or 7 for the level of the fire brigade he or she is leading and the applicable site-specific requirements as defined by the management of the industrial fire brigade.

4.3.9* Industrial fire brigade members who operate industrial fire brigade apparatus in the performance of their duties at any level of qualification defined by this document shall meet the applicable requirements as determined by the management of the industrial fire brigade in Chapters 2 through 8 of NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*.

4.3.9.1 Prior to operating industrial fire brigade apparatus, the fire apparatus operator/driver shall meet the job performance requirements of Chapter 4 and Chapter 5, Sections 5.1 through 5.3, and the applicable site-specific requirements as defined by the management of the industrial fire brigade.

Chapter 5 Incipient Industrial Fire Brigade Member

5.1 General. This duty shall involve initiating communications, using facility communications equipment to effectively relay oral or written information, responding to alarms, returning equipment to service, and completing incident reports, according to the following job performance requirements.

5.1.1 Qualification or Certification. For qualification or certification at the incipient industrial fire brigade level, the industrial fire brigade member shall meet the job performance requirements of Chapter 4 and Chapter 5, Sections 5.1 and 5.2, and the site-specific requirements in Section 5.3 as defined by the management of the industrial fire brigade and the requirements defined in Chapter 2, Awareness Level, of NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents*.

5.1.2 Basic Incipient Fire Brigade Member Job Performance Requirements. All industrial fire brigade members shall have a general knowledge of basic fire behavior, operation within an incident management system, operation within the emergency response operations plan for the site, the standard operating and safety procedures for the site, and site-specific hazards.

5.1.2.1 Initiate a response to a reported emergency, given the report of an emergency, facility standard operating procedures, and communications equipment, so that all necessary information is obtained and communications equipment is operated properly.

(A) Requisite Knowledge. Procedures for reporting an emergency.

(B) Requisite Skills. The ability to operate facility communications equipment, relay information, and record information.

5.1.2.2* Transmit and receive messages via the facility communications system, given facility communications equipment and operating procedures, so that the information is promptly relayed and is accurate, complete, and clear.

(A) Requisite Knowledge. Facility communications procedures and etiquette for routine traffic, emergency traffic, and emergency evacuation signals.

(B) Requisite Skills. The ability to operate facility communications equipment and discriminate between routine and emergency communications.

5.1.2.3 Respond to a facility emergency, given the necessary equipment and facility response procedures, so that the team member arrives in a safe manner.

(A) Requisite Knowledge. Facility layout, special hazards, and emergency response procedures.

(B) Requisite Skills. The ability to recognize response hazards and to safely use each piece of response equipment provided.

5.1.2.4* Return equipment to service, given an assignment, policies, and procedures, so that the equipment is inspected, damage is noted, the equipment is clean, and the equipment is placed in a ready state for service or is reported otherwise.

(A) Requisite Knowledge. Types of cleaning methods for various equipment, correct use of cleaning materials, and manufacturer's or facility guidelines for returning equipment to service.

(B) Requisite Skills. The ability to clean, inspect, and maintain equipment and to complete recording and reporting procedures.

5.1.2.5* Complete a basic incident report, given the report forms, guidelines, and information, so that all pertinent information is recorded, the information is accurate, and the report is complete.

(A) Requisite Knowledge. Content requirements for basic incident reports, the purpose and usefulness of accurate reports, consequences of inaccurate reports, and how to obtain necessary information.

(B) Requisite Skills. The ability to determine necessary information, proof reports, and operate facility equipment necessary to complete reports.

5.2 Manual Fire Suppression. This duty shall involve tasks related to the manual control of fires and property conservation activities by the incipient industrial fire brigade member.

5.2.1* Extinguish incipient fires, given an incipient fire and a selection of portable fire extinguishers, so that the correct extinguisher is chosen, the fire is completely extinguished, proper extinguisher-handling techniques are followed, and the area of origin and fire cause evidence are preserved.

(A) Requisite Knowledge. The classifications of fire; risks associated with each class of fire; and the types, rating systems, operating methods, and limitations of portable fire extinguishers.

(B) Requisite Skills. The ability to select, carry, and operate portable fire extinguishers, using the appropriate extinguisher based on the size and type of fire.

5.2.2* Conserve property, given special tools and equipment and an assignment within the facility, so that the facility and its contents are protected from further damage.

(A) Requisite Knowledge. The purpose of property conservation and its value to the organization, methods used to protect property, methods to reduce damage to property, types of and uses for salvage covers, and operations at properties protected with automatic sprinklers or special protection systems.

(B) Requisite Skills. The ability to deploy covering materials, control extinguishing agents, and cover building openings, including doors, windows, floor openings, and roof openings.

5.2.3 Exit hazardous area, given that the fire has progressed beyond the incipient stage, so that a safe haven is found and the team members' safety is maintained.

(A) Requisite Knowledge. Communication procedures, emergency evacuation methods, what constitutes a safe haven, and elements that create or indicate a hazard.

(B) Requisite Skills. The ability to follow facility evacuation routes, evaluate areas for hazards, and identify a safe haven.

5.3* Site-Specific Requirements. The following job performance requirements shall be considered as site-specific functions of the incipient industrial fire brigade member. The management of the industrial fire brigade shall determine the requirements that are applicable to the incipient industrial fire brigade members operating on their site. The process used to determine the site-specific requirements shall be documented, and the job performance requirements identified shall be added to those identified by this standard.

5.3.1* Attack an incipient stage fire, given a hose line flowing up to 473 L/min (125 gpm), appropriate equipment, and a fire situation, so that the fire is approached safely, exposures are protected, the spread of fire is stopped, agent application is effective, the fire is extinguished, and the area of origin and fire cause evidence are preserved.

(A) Requisite Knowledge. Types of handlines used for attacking incipient fires, precautions to be followed when advancing hose lines to a fire, observable results that a fire stream has been properly applied, dangerous building conditions created by fire, principles of exposure protection, and dangers such as exposure to products of combustion resulting from fire condition.

(B) Requisite Skills. The ability to recognize inherent hazards related to the material's configuration; operate handlines; prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow; advance charged and uncharged hose; extend hose lines; operate hose lines; evaluate and modify water application for maximum penetration; assess patterns for origin determination; and evaluate for complete extinguishment.

5.3.2* Activate a fixed fire protection system, given a fixed fire protection system, a procedure, and an assignment, so that the steps are followed and the system operates.

(A) Requisite Knowledge. Types of extinguishing agents, hazards associated with system operation, how the system operates, sequence of operation, system overrides and manual intervention procedures, and shutdown procedures to prevent damage to the operated system or to those systems associated with the operated system.

(B) Requisite Skills. The ability to operate fixed fire protection systems via electrical or mechanical means.

5.3.3* Utilize master stream appliances, given an assignment, an extinguishing agent, and a master stream device, so that the agent is applied to the fire as assigned.

(A) Requisite Knowledge. Safe operation of master stream appliances, uses for master stream appliances, tactics using fixed master stream appliances, and property conservation.

(B) Requisite Skills. The ability to put into service a fixed master stream appliance, and to evaluate and forecast a fire's growth and development.

5.3.4* Establish a water supply for fire-fighting operations, given an assignment, a water source, and tools, so that a water supply is established and maintained.

(A) Requisite Knowledge. Water sources, operation of site water supply components, hydraulic principles, and the effect of mechanical damage and temperatures on the operability of the water supply source.

(B) Requisite Skills. The ability to operate the site water supply components and to identify damage or impairment.

5.3.5 Perform a fire safety survey in a facility, given an assignment, survey forms, and procedures, so that fire and life safety hazards are identified, recommendations for their correction are made, and unresolved issues are referred to the proper authority.

(A) Requisite Knowledge. Organizational policy and procedures, common causes of fire and their prevention, the importance of fire safety, and referral procedures.

(B) Requisite Skills. The ability to complete forms, recognize hazards, match findings to preapproved recommendations, and effectively communicate findings to the proper authority.

Chapter 6 Advanced Exterior Industrial Fire Brigade Member

6.1* General.

6.1.1 Qualification or Certification. For qualification or certification at the advanced exterior industrial fire brigade member level, the industrial fire brigade member shall meet the job performance requirements of Chapter 4 and Chapter 5, Sections 5.1 and 5.2, Chapter 6, Sections 6.1 and 6.2, and the site-specific requirements in Sections 5.3 and 6.3 as defined by the management of the industrial fire brigade.

6.1.2 Basic Advanced Exterior Industrial Fire Brigade Member Job Performance Requirements.

6.1.2.1 Utilize a pre-incident plan, given pre-incident plans and an assignment, so that the industrial fire brigade member implements the responses detailed by the plan.

(A) Requisite Knowledge. The sources of water supply for fire protection or other fire-extinguishing agents, site-specific hazards, the fundamentals of fire suppression and detection systems including specialized agents, and common symbols used in diagramming construction features, utilities, hazards, and fire protection systems.

(B) Requisite Skills. The ability to identify the components of the pre-fire plan such as fire suppression and detection systems, structural features, site-specific hazards, and response considerations.

6.1.2.2* Interface with outside mutual aid organizations, given SOPs for mutual aid response and communication protocols, so that a unified command is established and maintained.

(A) Requisite Knowledge. Mutual aid procedures and the structure of the mutual aid organization, site SOPs, and incident management systems.

(B) Requisite Skills. The ability to communicate with mutual aid organizations and to integrate operational personnel into teams under a unified command.

6.2 Manual Fire Suppression.

6.2.1* Use thermal protective clothing during exterior fire-fighting operations, given thermal protective clothing, so that the clothing is correctly donned and worn.

(A) Requisite Knowledge. Conditions that require personal protection, uses and limitations of thermal protective clothing, components of thermal protective clothing ensemble, and donning and doffing procedures.

(B) Requisite Skills. The ability to correctly don and doff thermal protective clothing and to perform assignments while wearing thermal protective clothing.

6.2.2* Use SCBA and PASS device during exterior fire-fighting operations, given SCBA, PASS, thermal protective clothing, and other personal protective equipment, so that the SCBA and PASS device are correctly donned and activated, the equipment is correctly worn, controlled breathing techniques are used, emergency procedures are enacted if the SCBA fails, all low-air warnings are recognized, respiratory protection is not intentionally compromised, and hazardous areas are exited prior to air depletion.

(A) Requisite Knowledge. Conditions that require respiratory protection, uses and limitations of SCBA, components of SCBA, donning procedures, breathing techniques, indications for and emergency procedures used with SCBA, and physical requirements of the SCBA wearer.

(B) Requisite Skills. The ability to control breathing, use SCBA in limited visibility conditions, replace SCBA air cylinders, use SCBA to exit through restricted passages, initiate and complete emergency procedures in the event of SCBA failure or air depletion, and complete donning procedures.

6.2.3* Operating as a member of a team, attack an exterior fire, given a water source, an attack line, personal protective equipment, tools, and an assignment, so that team integrity is maintained, the attack line is properly deployed for advancement, access is gained into the fire area, appropriate application practices are used, the fire is approached safely, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, the correct body posture is maintained, hazards are avoided or managed, and the fire is brought under control.

(A) Requisite Knowledge. Principles of fire streams; types, design, operation, nozzle pressure effects, and flow capabilities of nozzles; precautions to be followed when advancing hose lines to a fire; observable results that a fire stream has been correctly applied; dangerous conditions created by fire; principles of exposure protection; potential long-term consequences of exposure to products of combustion; physical states of matter in which fuels are found; and the application

of each size and type of attack line, the role of the backup team in fire attack situations, attack and control techniques, and exposing hidden fires.

(B) Requisite Skills. The ability to prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow and patterns; apply water using direct, indirect, and combination attacks; advance charged and uncharged 38 mm (1½ in.) diameter or larger hose lines; extend hose lines; replace burst hose sections; operate charged hose lines of 38 mm (1½ in.) diameter or larger; couple and uncouple various handline connections; carry hose; attack fires; and locate and suppress hidden fires.

6.2.4 Operating as a member of a team, conduct a search and rescue, given an assignment, obscured vision conditions, personal protective equipment, a flashlight, forcible entry tools, hose lines, and ladders when necessary, so that all equipment is correctly used, all assigned areas are searched, all victims are located and removed, team integrity is maintained, and team members' safety, including respiratory protection, is not compromised.

(A) Requisite Knowledge. Use of appropriate tools and equipment, psychological effects of operating in obscured conditions and ways to manage them, methods to determine if an area is tenable, primary and secondary search techniques, team members' roles and goals, methods to use and indicators of finding victims, victim removal methods, and considerations related to respiratory protection.

(B) Requisite Skills. The ability to use SCBA to exit through restricted passages, use tools and equipment for various types of rescue operations, rescue a fire fighter with functioning respiratory protection, rescue a fire fighter whose respiratory protection is not functioning, rescue a person who has no respiratory protection, and assess areas to determine tenability.

6.2.5* Operating as a member of a team, conserve property, given special tools and equipment and an assignment within the facility, so that exposed property and the environment are protected from further damage.

(A) Requisite Knowledge. The purpose of property conservation and its value to the organization, methods used to protect property, methods to reduce damage to property, types of and uses for salvage covers, operations at properties protected with automatic sprinklers or special protection systems, understanding the impact of using master streams and multiple hose streams on property conservation, particularly as it can relate to the impact on outside facilities.

(B) Requisite Skills. The ability to deploy covering materials, control extinguishing agents, and cover building openings, including doors, windows, floor openings, and roof openings.

6.2.6 Overhaul a fire scene, given personal protective equipment, attack line, hand tools, a flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

(A) Requisite Knowledge. Types of fire attack lines and water application devices most effective for overhaul, water application methods for extinguishment that limit water damage, types of tools and methods used to expose hidden fire, dangers associated with overhaul, obvious signs of area of origin or signs of arson, and reasons for protection of fire scene.

(B) Requisite Skills. The ability to deploy and operate an attack line, expose void spaces without compromising structural integrity, apply water for maximum effectiveness, expose and extinguish hidden fires, recognize and preserve obvious signs of area of origin and fire cause, and evaluate for complete extinguishment.

6.2.7* Establish a water supply for fire-fighting operations, given a water source and tools, so that a water supply is established and maintained.

(A) Requisite Knowledge. Water sources, correct operation of site water supply components, hydraulic principles, and the effect of mechanical damage and temperatures on the operability of the water supply source.

(B) Requisite Skills. The ability to operate the site water supply components and identify damage or impairment.

6.2.8* Exit a hazardous area as a team, given vision-obscured conditions, so that a safe haven is found before exhausting the air supply, others are not endangered, and the team integrity is maintained.

(A) Requisite Knowledge. Personnel accountability systems, communication procedures, emergency evacuation methods, what constitutes a safe haven, elements that create or indicate a hazard, and emergency procedures for loss of air supply.

(B) Requisite Skills. The ability to operate as a team member in vision-obscured conditions, locate and follow a guideline, conserve air supply, and evaluate areas for hazards and identify a safe haven.

6.3* Site-Specific Requirements. The following job performance requirements shall be considered as site-specific functions of the advanced exterior industrial fire brigade member. The management of the industrial fire brigade shall determine the requirements that are applicable to the advanced exterior industrial fire brigade member operating on their site. The process used to determine the site-specific requirements shall be documented, and the job performance requirements identified shall be added to those identified by this standard.

6.3.1 Perform a fire safety survey in a facility, given an assignment, survey forms, and procedures, so that fire and life safety hazards are identified, recommendations for their correction are made, and unresolved issues are referred to the proper authority.

(A) Requisite Knowledge. Organizational policy and procedures, common causes of fire and their prevention, and the importance of fire safety and referral procedures.

(B) Requisite Skills. The ability to complete forms, recognize hazards, match findings to pre-approved recommendations, and effectively communicate findings to the proper authority.

6.3.2* Gain access to facility locations, given keys, forcible entry tools (e.g., bolt cutters, small hand tools, and ladders), and an assignment, so that areas are accessed and remain accessible during advanced exterior industrial fire brigade operations.

(A) Requisite Knowledge. Site drawing reading, access procedures, forcible entry tools and procedures, and site-specific hazards, such as access to areas restricted by rail car movement, fences, and walls. Procedures associated with special hazard areas such as electrical substation, radiation hazard areas, and others specific to the site if needed.

(B) Requisite Skills. The ability to read site drawings, identify areas of low overhead clearance, identify areas on roadways having load restrictions, identify access routes to water supplies, identify hazardous materials locations, identify electrical equipment locations (overhead and belowgrade equipment), ability to open gates by manual and/or automatic means, ability to forcibly gain access to areas, and the ability to identify site hazards.

6.3.3 Utilize master stream appliances, given an assignment, an extinguishing agent, and a master stream device and supply hose, so that the appliance is set up correctly and the agent is applied as assigned.

(A) Requisite Knowledge. Correct operation of master stream appliances, uses for master stream appliances, tactics using master stream appliances, selection of the master stream appliance for different fire situations, the effect of master stream appliances on search and rescue, ventilation procedures, and property conservation.

(B) Requisite Skills. The ability to correctly put in service a master stream appliance and evaluate and forecast a fire's growth and development.

6.3.4* Operating as a member of a team, extinguish an ignitable liquid fire, given an assignment, an attack line, personal protective equipment, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a correctly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, re-ignition is prevented, and team protection is maintained.

(A) Requisite Knowledge. Methods by which foam prevents or controls a hazard; principles by which foam is generated; causes for poor foam generation and corrective measures; difference between hydrocarbon and polar solvent fuels and the concentrates that work on each; the characteristics, uses, and limitations of fire-fighting foams; the advantages and disadvantages of using fog nozzles versus foam nozzles for foam application; foam stream application techniques; hazards associated with foam usage; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to prepare a foam concentrate supply for use, assemble foam stream components, master various foam application techniques, and approach and retreat from fires/spills as part of a coordinated team.

6.3.5* Operating as a member of a team, control a flammable gas fire, given an assignment, an attack line, personal protective equipment, and tools, so that crew integrity is maintained, contents are identified, the flammable gas source is controlled or isolated, hazardous conditions are recognized and acted upon, and team safety is maintained.

(A) Requisite Knowledge. Characteristics of flammable gases, components of flammable gas systems, effects of heat and pressure on closed containers, boiling liquid expanding vapor explosion (BLEVE) signs and effects, methods for identifying contents, water stream usage and demands for pressurized gas fires, what to do if the fire is prematurely extinguished, alternative actions related to various hazards, and when to retreat.

(B) Requisite Skills. The ability to execute effective advances and retreats, apply various techniques for water application, assess gas storage container integrity and changing conditions, operate control valves, and choose effective procedures when conditions change.

6.3.6* Operating as a member of a team, extinguish an exterior fire using special extinguishing agents other than foam, given an assignment, an attack line, personal protective equipment, and an extinguishing agent supply, so that fire is extinguished, re-ignition is prevented, and team protection is maintained.

(A) Requisite Knowledge. Methods by which special agents, such as dry chemical, dry powder, and carbon dioxide, prevent or control a hazard; principles by which special agents are generated; the characteristics, uses, and limitations of fire-fighting special agents; the advantages and disadvantages of using special agents; special agents application techniques; hazards associated with special agents usage; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to operate a special agent supply for use, master various special agents application techniques, and approach and retreat from hazardous areas as part of a coordinated team.

6.3.7* Interpret alarm conditions, given an alarm signaling system, a procedure, and an assignment, so that the alarm condition is correctly interpreted and a response is initiated.

(A) Requisite Knowledge. The different alarm detection systems within the facility; difference between alarm, trouble, and supervisory alarms; hazards protected by the detection systems; hazards associated with each type of alarm condition; knowledge of the emergency response plan; and communication procedures.

(B) Requisite Skills. The ability to understand the different types of alarms, to implement the response, and to provide information through communications.

6.3.8* Activate a fixed fire protection system, given personal protective equipment, a fixed fire protection system, a procedure, and an assignment, so that the correct steps are followed and the system operates.

(A) Requisite Knowledge. Different types of extinguishing agents, hazards associated with system operation, how the system operates, sequence of operation, system overrides and manual intervention procedures, and shutdown procedures to prevent damage to the operated system or to those systems associated with the operated system.

(B) Requisite Skills. The ability to operate fixed fire suppression systems via electrical or mechanical means and to properly shut down fixed fire suppression systems.

6.3.9* Operating as a member of a team, extinguish a Class C (electrical) fire, given an assignment, a Class C fire extinguishing appliance/extinguisher, and personal protective equipment, so that the proper type of Class C agent is selected for the condition, a properly applied agent is applied to the fuel, fire is extinguished, re-ignition is prevented, team protection is maintained, and the hazard is faced until retreat to safe haven is reached.

(A) Requisite Knowledge. Methods by which Class C agent prevents or controls a hazard; methods by which Class C fires are de-energized; causes of injuries from Class C fire fighting on live Class C fires with Class A agents and the Class C agents; the extinguishing agents' characteristics, uses, and limitations; the advantages and disadvantages of de-energizing as using

water fog nozzles on a Class A or Class B fire; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to operate Class C fire extinguishers or fixed systems and approach and retreat from Class C fires as part of a coordinated team.

6.3.10* Utilize tools and equipment assigned to the industrial fire brigade, given an assignment and specific tools, so that tools are selected and correctly used under adverse conditions in accordance with manufacturer's recommendations and the policies and procedures of the brigade.

(A) Requisite Knowledge. Available tools and equipment, their storage locations, and their correct use in accordance with recognized practices, and selection of tools and equipment given different conditions.

(B) Requisite Skills. The ability to select and use the correct tools and equipment for various tasks, follow guidelines, and restore tools and equipment to service after use.

6.3.11 Set up and use portable ladders, given an assignment, single and extension ladders, and team members as appropriate, so that hazards are assessed, the ladder is stable, the angle is correct for climbing, extension ladders are extended to the correct height with the fly locked, the top is placed against a reliable structural component, and the assignment is accomplished.

(A) Requisite Knowledge. Parts of a ladder, hazards associated with setting up ladders, what constitutes a stable foundation for ladder placement, different angles for various tasks, safety limits to the degree of angulation, and what constitutes a reliable structural component for top placement.

(B) Requisite Skills. The ability to carry ladders, raise ladders, extend ladders and lock flies, determine that a wall and roof will support the ladder, judge extension ladder height requirements, and place the ladder to avoid obvious hazards.

Chapter 7 Interior Structural Industrial Fire Brigade Member

7.1 General.

7.1.1 Qualification or Certification. For qualification or certification at the interior structural industrial fire brigade member level, the member shall meet the job performance requirements of Chapter 4, Chapter 5, Sections 5.1 and 5.2, and Chapter 7, Sections 7.1 and 7.2, and the site-specific requirements in Sections 5.3 and 7.3 as defined by the management of the industrial fire brigade.

7.1.2* Basic Interior Structural Fire Brigade Member Job Performance Requirements.

7.1.2.1 Use thermal protective clothing during structural fire-fighting operations, given thermal protective clothing, so that the clothing is correctly donned and worn.

(A) Requisite Knowledge. Conditions that require personal protection, uses and limitations of thermal protective clothing, components of thermal protective clothing ensemble, and donning and doffing procedures.

(B) Requisite Skills. The ability to correctly don and doff thermal protective clothing and perform assignments while wearing thermal protective clothing.

7.1.2.2* Use SCBA and PASS device during interior fire-fighting operations, given SCBA, PASS, thermal protective clothing, and other personal protective equipment, so that the SCBA and PASS device are correctly donned and activated, the equipment is correctly worn, controlled breathing techniques are used, emergency procedures are enacted if the SCBA fails, all low-air warnings are recognized, respiratory protection is not intentionally compromised, and hazardous areas are exited prior to air depletion.

(A) Requisite Knowledge. Conditions that require respiratory protection, uses and limitations of SCBA, components of SCBA, donning procedures, breathing techniques, indications for and emergency procedures used with SCBA, and physical requirements of the SCBA wearer.

(B) Requisite Skills. The ability to control breathing, use SCBA in limited visibility conditions, replace SCBA air cylinders, use SCBA to exit through restricted passages, initiate and complete emergency procedures in the event of SCBA failure or air depletion, and complete donning procedures.

7.1.2.3 Utilize a pre-incident plan, given pre-incident plans and an assignment, so that the industrial fire brigade member implements the pre-incident plan.

(A) Requisite Knowledge. The sources of water supply for fire protection or other fire-extinguishing agents, site-specific hazards, the fundamentals of fire suppression and detection systems including specialized agents, and common symbols used in diagramming construction features, utilities, hazards, and fire protection systems.

(B) Requisite Skills. The ability to identify the components of the pre-incident plan such as fire suppression and detection systems, structural features, site-specific hazards, and response considerations.

7.2 Manual Fire Suppression.

7.2.1* Operating as a member of a team, attack an interior structural fire, given a water source, an attack line, personal protective equipment, tools, and an assignment, so that team integrity is maintained, the attack line is deployed for advancement, access is gained into the fire area, correct application practices are used, the fire is approached safely, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, the correct body posture is maintained, hazards are avoided or managed, and the fire is brought under control.

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

(B) Requisite Skills. The ability to prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow and patterns; apply water using direct, indirect, and combination attacks; advance charged and uncharged

38 mm (1½ in.) diameter or larger hose lines; extend hose lines; replace burst hose sections; operate charged hose lines of 38 mm (1½ in.) diameter or larger; couple and uncouple various handline connections; carry hose; attack fires; and locate and suppress hidden fires.

7.2.2 Force entry into a structure, given personal protective equipment, tools, and an assignment, so that the tools are used, the barrier is removed, and the opening is in a safe condition and ready for entry.

(A) Requisite Knowledge. Basic construction of typical doors, windows, and walls within the facility; operation of doors, windows, and locks; and the dangers associated with forcing entry through doors, windows, and walls.

(B) Requisite Skills. The ability to transport and operate site-specific tools and to force entry through doors, windows, and walls using assorted methods and tools.

7.2.3* Operating as a member of a team, perform ventilation on a structure, given an assignment, personal protective equipment, and tools, so that a sufficient opening is created, all ventilation barriers are removed, structural integrity is not compromised, and products of combustion are released from the structure.

(A) Requisite Knowledge. The principles, advantages, limitations, and effects of horizontal and vertical ventilation; safety considerations when venting a structure; the methods of heat transfer; the principles of thermal layering within a structure on fire; fire behavior in a structure; the products of combustion found in a structure fire; the signs, causes, effects, and prevention of backdrafts; and the relationship of oxygen concentration to life safety and fire growth.

(B) Requisite Skills. The ability to safely create an opening and implement ventilation techniques and to transport and operate tools and equipment.

7.2.4* Overhaul a fire scene, given personal protective equipment, attack line, hand tools, a flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

(A) Requisite Knowledge. Types of fire attack lines and application devices most effective for overhaul, application methods for extinguishing agents that limit damage, types of tools and methods used to expose hidden fire, dangers associated with overhaul, obvious signs of area of origin or signs of arson, and reasons for protection of fire scene.

(B) Requisite Skills. The ability to deploy and operate an attack line, expose void spaces without compromising structural integrity, apply extinguishing agents for maximum effectiveness, expose and extinguish hidden fires, recognize and preserve obvious signs of area of origin and fire cause, and evaluate for complete extinguishment.

7.2.5* Exit a hazardous area as a team, given vision-obscured conditions, so that a safe haven is found before exhausting the air supply, others are not endangered, and the team integrity is maintained.

(A) Requisite Knowledge. Personnel accountability systems, communication procedures, emergency evacuation methods, what constitutes a safe haven, elements that create or indicate a hazard, and emergency procedures for loss of air supply.

(B) Requisite Skills. The ability to operate as a team member in vision-obscured conditions, locate and follow a guideline, conserve air supply, and evaluate areas for hazards and identify a safe haven.

7.2.6* Establish a water supply for fire-fighting operations, given a water source and tools, so that a water supply is established and maintained.

(A) Requisite Knowledge. Water sources, correct operation of site water supply components, hydraulic principles, and the effect of mechanical damage and temperatures on the operability of the water supply source.

(B) Requisite Skills. The ability to operate the site water supply components and identify damage or impairment.

7.3* Site-Specific Requirements. The following job performance requirements shall be considered as site-specific functions of the interior structural industrial fire brigade member. The management of the industrial fire brigade shall determine the requirements that are applicable to the interior structural industrial fire brigade member operating on their site. The process used to determine the site-specific requirements shall be documented, and the job performance requirements identified shall be added to those identified by this standard.

7.3.1* Interpret alarm conditions, given an alarm signaling system, a procedure, and an assignment, so that the alarm condition is correctly interpreted and a response is initiated.

(A) Requisite Knowledge. The different alarm detection systems within the facility; difference between alarm, trouble, and supervisory alarms; hazards protected by the detection systems; hazards associated with each type of alarm condition; the emergency response plan; and communication procedures.

(B) Requisite Skills. The ability to understand the different types of alarms, to implement the response, and to provide information through communications.

7.3.2* Activate a fixed fire protection system, given personal protective equipment, a fixed fire protection system, a procedure, and an assignment, so that the procedures are followed and the system operates.

(A) Requisite Knowledge. Different types of extinguishing agents on site, manual fire suppression activities within areas covered by fixed fire suppression systems, hazards associated with system operation, how the system operates, sequence of operation, system overrides and manual intervention procedures, and shutdown procedures to prevent damage to the operated system or to those systems associated with the operated system.

(B) Requisite Skills. The ability to operate fixed fire suppression systems via electrical or mechanical means and to shut down fixed fire suppression systems.

7.3.3 Utilize master stream appliances, given an assignment, an extinguishing agent, a master stream device, and supply hose, so that the appliance is set up correctly and the agent is applied as assigned.

(A) Requisite Knowledge. Correct operation of master stream appliances; uses for master stream appliances; tactics using master stream appliances; selection of the master stream appliance for different fire situations; the effect of master stream

appliances on search and rescue, ventilation procedures, and property conservation.

(B) Requisite Skills. The ability to correctly put in service a master stream appliance and to evaluate and forecast a fire's growth and development.

7.3.4* Operating as a member of a team, extinguish an ignitable liquid fire, given an assignment, an attack line, personal protective equipment, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a correctly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, re-ignition is prevented, and team protection is maintained.

(A) Requisite Knowledge. Methods by which foam prevents or controls a hazard; principles by which foam is generated; causes for poor foam generation and corrective measures; difference between hydrocarbon and polar solvent fuels and the concentrates that work on each; the characteristics, uses, and limitations of fire-fighting foams; the advantages and disadvantages of using fog nozzles versus foam nozzles for foam application; foam stream application techniques; hazards associated with foam usage; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to prepare a foam concentrate supply for use, assemble foam stream components, master various foam application techniques, and approach and retreat from fires/spills as part of a coordinated team.

7.3.5* Operating as a member of a team, control a flammable gas fire, given an assignment, an attack line, personal protective equipment, and tools, so that crew integrity is maintained, contents are identified, the flammable gas source is controlled or isolated, hazardous conditions are recognized and acted upon, and team safety is maintained.

(A) Requisite Knowledge. Characteristics of flammable gases, components of flammable gas systems, effects of heat and pressure on closed containers, BLEVE signs and effects, methods for identifying contents, water stream usage and demands for pressurized gas fires, what to do if the fire is prematurely extinguished, alternative actions related to various hazards, and when to retreat.

(B) Requisite Skills. The ability to execute effective advances and retreats, apply various techniques for water application, assess gas storage container integrity and changing conditions, operate control valves, and choose effective procedures when conditions change.

7.3.6* Operating as a member of a team, extinguish a fire using special extinguishing agents other than foam, given an assignment, an attack line, personal protective equipment, and an extinguishing agent supply, so that fire is extinguished, re-ignition is prevented, and team protection is maintained.

(A) Requisite Knowledge. Methods by which special agents, such as dry chemical, dry powder, and carbon dioxide, prevent or control a hazard; principles by which special agents are generated; the characteristics, uses, and limitations of fire-fighting special agents; the advantages and disadvantages of using special agents; special agents application techniques; hazards associated with special agents usage; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to operate a special agent supply for use, master various special agents application techniques, and approach and retreat from hazardous areas as part of a coordinated team.

7.3.7* Utilize tools and equipment assigned to the industrial fire brigade, given an assignment and specific tools, so that tools are selected and correctly used under adverse conditions in accordance with manufacturer's recommendations and the policies and procedures of the brigade.

(A) Requisite Knowledge. Available tools and equipment, their storage locations, and their correct use in accordance with recognized practices; and selection of tools and equipment given different conditions.

(B) Requisite Skills. The ability to select and use the correct tools and equipment for various tasks, follow guidelines, and restore tools and equipment to service after use.

7.3.8 Set up and use portable ladders, given an assignment, single and extension ladders, and team members as appropriate, so that hazards are assessed, the ladder is stable, the angle is correct for climbing, extension ladders are extended to the correct height with the fly locked, the top is placed against a reliable structural component, and the assignment is accomplished.

(A) Requisite Knowledge. Parts of a ladder, hazards associated with setting up ladders, what constitutes a stable foundation for ladder placement, different angles for various tasks, safety limits to the degree of angulation, and what constitutes a reliable structural component for top placement.

(B) Requisite Skills. The ability to carry ladders, raise ladders, extend ladders and lock flies, determine that a wall and roof will support the ladder, judge extension ladder height requirements, and place the ladder to avoid obvious hazards.

7.3.9* Interface with outside mutual aid organizations, given SOPs for mutual aid response and communication protocols, so that a unified command is established and maintained.

(A) Requisite Knowledge. Mutual aid procedures and the structure of the mutual aid organization, site SOPs, and incident management systems.

(B) Requisite Skills. The ability to communicate with mutual aid organizations and to integrate operational personnel into teams under a unified command.

7.3.10 Perform a fire safety survey in a facility, given an assignment, survey forms, and procedures, so that fire and life safety hazards are identified, recommendations for their correction are made, and unresolved issues are referred to the proper authority.

(A) Requisite Knowledge. Organizational policy and procedures, common causes of fire and their prevention, and the importance of fire safety and referral procedures.

(B) Requisite Skills. The ability to complete forms, recognize hazards, match findings to pre-approved recommendations, and effectively communicate findings to the proper authority.

Chapter 8 Industrial Fire Brigade Leader

8.1 General.

8.1.1 This duty shall involve establishing command, using emergency response procedures, and overseeing the emergency response and other administrative duties as outlined in

NFPA 600, *Standard on Industrial Fire Brigades*, Chapter 2, depending on the site organizational statement.

8.1.2 Qualification or Certification. For qualification or certification as an industrial fire brigade leader, the member shall meet the job performance requirements of the level of the industrial fire brigade in which they are leading in accordance with the requirements of Chapters 5, 6, or 7 and the job performance requirements as defined in Sections 8.1 and 8.2.

8.1.3 General Requisite Knowledge. The organizational structure of the industrial fire brigade; operating procedures for administration, emergency operations, and safety; information management and record keeping; incident management system; methods used by leaders to obtain cooperation within a group of subordinates; and policies and procedures regarding the operation of the industrial fire brigade.

8.2 Supervisory Functions.

8.2.1 Assign tasks or responsibilities to members, given an emergency situation, so that the instructions are complete, clear, and concise; safety considerations are addressed; and the desired outcomes are conveyed.

(A) Requisite Knowledge. Verbal communications during emergency situations, techniques used to make assignments under stressful situations, and methods of confirming understanding of assigned tasks.

(B) Requisite Skills. The ability to condense instructions for frequently assigned unit tasks based upon training and SOPs.

8.2.2 Develop an initial action plan, given size-up information for an incident and assigned emergency response resources, so that resources are deployed to control the emergency.

(A)* Requisite Knowledge. Elements of a size-up, SOPs for emergency operations, and fire behavior.

(B) Requisite Skills. The ability to analyze emergency scene conditions, to allocate resources, and to communicate verbally.

8.2.3 Implement an action plan at an emergency situation, given assigned resources, type of incident, preliminary plan, and fire brigade safety policies and procedures, so that resources are deployed to mitigate the situation and team safety is maintained.

(A) Requisite Knowledge. SOPs, resources available, basic fire control and emergency operation procedures, an incident management system, personnel accountability system, common causes of personal injury during fire brigade activities, safety policies and procedures, and basic industrial fire brigade member safety.

(B)* Requisite Skills. The ability to implement an incident management system, to communicate verbally, to supervise and account for assigned personnel under emergency conditions, and to identify safety hazards.

8.2.4* Coordinate multiple resources, such as in-house and mutual aid, during emergency situations, given an incident requiring multiple resources and a site incident management system, so that the site incident management system is implemented and the required resources, their assignments, and safety considerations for successful control of the incident are identified.

(A) Requisite Knowledge. SOPs and local resources available for the handling of the incident under emergency situations, basic fire control and emergency operation procedures, an incident management system, and a personnel accountability system.

(B) Requisite Skills. The ability to implement the site incident management system, to communicate verbally, and to supervise and account for assigned personnel under emergency conditions.

Annex A Explanatory Material

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

A.1.1 This standard is intended to comply with the industrial fire brigade–related requirements of 29 CFR 1910.156, Subpart L, and the industrial fire brigade–related requirements of 29 CFR 1910.134, "Respiratory Protection Standard" (2 in/2 out rule). Further, this standard is intended to ensure the industrial fire brigade member has the appropriate degree of occupational safety and health while performing industrial fire brigade duties, just as NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, ensures an appropriate degree of occupational safety and health for municipal fire department members.

For support functions beyond the scope of this document, see Annex B.

A.1.3.1 See Annex C for additional information regarding the use of job performance requirements for training and evaluation.

A.3.2.1 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.3.2.2 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.6.1 Advanced Exterior Fire Fighting. Advanced exterior fire fighting often requires industrial fire brigade members to contain, control, and extinguish exterior fires involving site-specific hazards, such as flammable and combustible liquid spills or leaks, liquefied petroleum gas releases, and electrical substations. Advanced exterior fire fighting is usually performed using handlines flowing up to 1140 L/min (300 gpm), master streams, or similar devices for the manual application of specialized agents. Thermal protective clothing is required and the use of self-contained breathing apparatus (SCBA) could be required.

A.3.3.6.4 Interior Structural Fire Fighting. This definition is taken from OSHA 29 CFR 1910. Rescue is the activity of removing victims by a fire brigade as part of fire-fighting activities. Rescue activities requiring specialized equipment and training, such as confined space and high angle rescue, are not included in this standard.

A.3.3.24 Support Member. When organizing the industrial fire brigade, management should take into consideration the need for specialized duties required in the event of a fire or related emergency and should assign personnel to the brigade to ensure that these duties are accomplished.

In most cases, personnel are not expected to perform manual fire suppression activities in the event of an emergency but are expected to perform only those specialized tasks for which they have been chosen. *(See Annex B for a list of specialized tasks.)*

A.3.3.27 Thermal Protective Clothing. For the purpose of this standard, full protective clothing for industrial fire brigade members above the incipient level is considered to include a turnout coat, protective trousers, fire-fighting boots, fire-fighting gloves, a protective hood, and a fire-fighting helmet. All equipment should be compliant with NFPA or applicable standards.

A.4.1 For information on medical requirements, see OSHA requirements in 29 CFR 1910.156 or NFPA 1582, *Standard on Medical Requirements for Fire Fighters and Information for Fire Department Physicians*.

A.4.2 Where management determines that emergency medical care capability is required to be provided by the industrial fire brigade personnel, programs such as the Department of Transportation First Responder and American Red Cross curricula offer models that can be followed.

A.4.3.1 See Annex D.

A.4.3.2 It is recommended, where practical, that evaluators be individuals who are not directly involved as instructors for the requirement being evaluated.

A.4.3.4 The Technical Committee on Industrial Fire Brigades Professional Qualifications uses the phrase "qualified or certified" throughout the standard because the industrial fire brigade management should determine whether industrial fire brigade members will be certified or qualified to perform emergency response activities. Many different factors are part of the industrial fire brigade management's decision-making process for certification or qualification. These factors can include company policy, local or state statutes, and training agency policy. It is not the intent of this standard to determine if industrial fire brigade members will be certified or qualified upon the completion of applicable JPRs.

A.4.3.9 NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, provides the framework for an industrial fire brigade apparatus driver/operator qualification program. Each fire brigade should develop a similar program that ensures that JPRs are developed for the functions that driver/operators will be expected to perform.

It is recognized that some of the JPRs listed in NFPA 1002 do not apply, such as the requirement that driver/operators should meet the requirements of NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, Sections 3.1 and 3.2. In addition, when a practical driving test is developed, it should incorporate situations that industrial fire brigade vehicle operator/drivers will experience, which might not include all of the situations listed in NFPA 1002, Section 2.3.

A.5.1.2.2 The industrial fire brigade member should be familiar with the communication systems and understand how the brigade will transmit and receive messages on the site. Management of the industrial fire brigade has the responsibility to ensure that fire brigade members are trained to site operating procedures. Facility communications equipment can include, but not be limited to, public address systems, intercom systems, radios, pagers, sirens, beacons, and messengers. All fire brigade members should understand the site procedures to address the intent of 2.4.6, Industrial Fire Brigade Communications, NFPA 600, *Standard on Industrial Fire Brigades*.

A.5.1.2.4 The incipient fire brigade member should be able to determine equipment operability and to ensure that equipment is returned to service as per site policy or procedure.

Fire brigade members may or may not be required by the management of the industrial fire brigade to perform inspections, maintenance, cleaning, or otherwise to service emergency response equipment, but it is incumbent upon the employer to ensure that the equipment is maintained per manufacturer requirements and appropriate codes and standards (e.g., NFPA 10, *Standard for Portable Fire Extinguishers*, NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems*, and NFPA 1962, *Standard for the Care, Use, and Service Testing of Fire Hose Including Couplings and Nozzles*).

The responsibilities for the maintaining, servicing, and cleaning of emergency response equipment should be identified in the fire brigade organizational statement.

A.5.1.2.5 The incident report may only entail contacting a supervisor and letting the supervisor know there was a fire, what agent was used, and any damage that occurred. The intent is to ensure that the management of the industrial fire brigade trains employees to provide all pertinent information for reporting fire incidents at the site. The report will assist the management of the industrial fire brigade to accomplish the incident documentation.

A.5.2.1 The incipient industrial fire brigade member should be able to extinguish fires in stacked or piled materials such as hay bales, pallets, lumber, piles of mulch, sawdust, other bulk Class A materials, or small, unattached structures that are attacked from the exterior. The tactics for extinguishing each of these types of fires are similar enough to be included in one JPR. Live fire evolutions should be conducted in accordance with the requirements of NFPA 1403, *Standard on Live Fire Training Evolutions*. In areas where environmental or other concerns restrict the use of normal fuels for training evolutions, properly installed and monitored gas-fueled fire simulators can be substituted.

With regard to Class D fires, some facilities utilize pyrophoric, water-reactive dry chemicals, and reactive metals such as magnesium, aluminum, and sodium in their facilities and catalysts. Industrial fire brigade members need to know that ordinary extinguishing agents such as water, foam, and carbon dioxide can react with these materials. Members should be trained in recognizing these site-specific hazards and should be trained in the use of Class D and other extinguishing agents. Members need to know that automatic fire protection systems can need to be shut down and should be trained in the proper procedures for shutting them down.

Class K fires are fires in cooking appliances that involve combustible cooking media such as vegetable or animal oils and fats. Some facilities have cooking facilities that can have fires involving Class K–type fires. Members should be trained in recognizing these site-specific hazards and should be trained in the use of Class K systems and extinguishers.

A.5.2.2 Industrial fire brigade members should be aware of the environmental concerns associated with fire extinguishment and runoff. Brigade members should be familiar with site-specific areas where these types of issues pose potential problems. Areas could include storm drains, sumps, bodies of water, terrain, and other areas where pollution could cause environmental concerns for the facility/site. Depending on the material(s) burning, the brigade members need to deal with concerns regarding flammable liquids or chemicals as well as the foam or other extinguishing agents, including water. The extinguishing agents need to be accounted for in the event of an environmental issue.

A.5.3 Each site can vary significantly in the amount and types of systems, tools, and equipment that are specific to that site. The management of the industrial fire brigade should document in the site SOPs the types of systems, tools, and equipment that will be available for industrial fire brigade use. If the system, tool, or equipment is available for use by the industrial fire brigade, the authority having jurisdiction should ensure that the appropriate section knowledge and skills are tested. *(See Annex D.)*

A.5.3.1 When possible, incipient industrial fire brigade members should attack a fire as a team to enhance the safety of the fire-fighting operation. The incipient industrial fire brigade member should maintain proper body posture when attacking a fire with a hose line. Caution should be taken when advancing hose lines during fire attack.

Incipient industrial fire brigade members can handle various-sized hose lines during offensive and defensive operations. The hose line diameter should be determined by the management of the industrial fire brigade and will be site specific. Water pressure and flow rate will depend on the water supply and the type of facility operation.

A.5.3.2 The incipient fire brigade member needs to have an understanding of fire protection systems provided. Members need to know how to manually actuate systems, their impact on other plant systems and safety of personnel, and policies and procedures for notification of the brigade when systems are out of service.

A.5.3.3 Incipient industrial fire brigades who are expected to use master stream devices should be able to perform defensive actions, utilizing master stream devices safely and effectively, in conformance with 1.4.3.2(5) of NFPA 600, *Standard on Industrial Fire Brigades*.

A.5.3.4 The fire brigade member should understand hydraulic principles and their effect on water flow. Operation of site water supplies could consist of opening valves or hydrants, starting pumps, drafting from static sources, and utilizing standpipes. The fire brigade member should also understand the specific requirements of the facility's water supply components and their operation (e.g., correct hydrant operation, including drainage and shutdown, and operation of pressure control devices).

A.6.1 Advanced exterior fire fighting is offensive fire fighting performed outside of an enclosed structure when the fire is beyond the incipient stage. Advanced exterior fire fighting often requires industrial fire brigade members to contain, control, and extinguish exterior fires involving site-specific hazards, such as flammable and combustible liquid spills or leaks, liquefied petroleum gas releases, and electrical equipment. Advanced exterior fire fighting is usually performed using handlines flowing up to 1137 L/min (300 gpm), master streams, or similar devices for the manual application of specialized agents. Thermal protection is required and the use of SCBA could be required.

A.6.1.2.2 Personnel accountability systems vary from site to site and should be incorporated into the site incident management system/standard operating procedures. This system should include the interface between the site personnel and the outside mutual aid personnel, recognizing that the personnel accountability system for the site can be different from that of the outside mutual aid.

A.6.2.1 The management of the industrial fire brigade should establish time requirements for the donning of thermal protective clothing by industrial fire brigade members.

A.6.2.2 The management of the industrial fire brigade should establish time requirements for the donning of thermal protective clothing by industrial fire brigade members. The SCBA donning process should be completed while wearing full thermal protective clothing. The physical and medical requirements associated with wearing SCBA are outlined in NFPA 600, *Standard on Industrial Fire Brigades*, and 29 CFR 1910.134, "Respiratory Protection Standard."

A.6.2.3 Exterior fires involving Class A materials, such as finished goods, raw materials, bulk materials, and pallets or waste materials stored in various containers and configuration, can be stacked, piled, rolled, baled, or stored in racks or shelving. Fire fighters need to understand the effects of fire and extinguishing agents and the collapse potential on those types of high-piled storage.

Fire fighters also need to understand the exposure problem associated with these types of fires, which usually produce flying brands that easily spread fire from one area to another. The fire fighter should be proficient at deploying and using 38 mm (1½ in.) and 65 mm (2½ in.) hose line and portable and fixed master stream appliances for offensive and defensive fire attack and exposure protection.

The fire fighters should also understand hose streams and use of straight nozzles for exterior fire fighting. Live fire training can be either Class A or B fires.

Class C fires become Class A or B fires when isolated. The fire brigade member should understand the potential shock hazard associated with Class C fires. A member should understand that high voltage wiring and equipment can have an electrical field that can create a shock hazard without actually having direct contact with the wire or equipment.

Fire fighters should understand the company policies for lockout, tagout, and testing equipment to verify that it has been de-energized and that the area or component is safe before entering locked electrical rooms or touching electrical equipment. The fire fighter should understand the safe method of using hose streams on electrical equipment.

A.6.2.5 Combustible or flammable liquids could spread to other areas, exposing additional facilities. Spread could be enhanced by application of water. Environmental impact can result from spread. Actions such as diking or rerouting runoff can be effective means to control exposure to additional facilities.

A.6.2.7 See A.5.3.4.

A.6.2.8 Personnel accountability systems vary from site to site and should be incorporated into the site incident management system/standard operating procedures. When training exercises are intended to simulate emergency conditions, smoke-generating devices that do not create a hazard are required. Several accidents have occurred when smoke bombs or other smoke-generating devices that produce a toxic atmosphere have been used for training exercises.

A.6.3 Each site can vary significantly in the amount and types of systems, tools, and equipment that are specific to that site. The management of the industrial fire brigade should document in the site SOPs the types of systems, tools, and equipment that will be available for industrial fire brigade use. If the system, tool, or equipment is available for use by the industrial fire brigade, the authority having jurisdiction should ensure that the appropriate section knowledge and skills are tested. (*See Annex D.*)

A.6.3.2 The industrial fire brigade member should understand site safety and security practices as identified by local laws, regulations, procedural instructions, and standards of care. Each site can vary significantly as to the duties industrial fire brigade members can be expected to perform when making entry into restricted areas. Entry into these areas can be accomplished by utilizing either forcible entry tools or routine access techniques. It is the intent of the committee to suggest that industrial fire brigade members are to be trained commensurate with the duties assigned.

A.6.3.4 The brigade member should understand the use of various types of foam and other extinguishing agent application for flammable and combustible liquid fires. Members should understand the various methods of extinguishment and the hazards associated with the various types of flammable and combustible liquid spills, leaks, and fires. Brigade members need to review and understand the storage containers, configuration, and processes where flammable and combustible liquids are stored, manufactured, and used. Plans need to be available that show piping layout, isolation valves, and remote shutdown locations.

Brigade members should review and understand boilover and slopover hazards associated with flammable and combustible liquid fires. Members should also understand the high heat release associated with flammable and combustible liquid fires and the impact on exposed processes, equipment, and facilities. The potential for structural collapse of equipment and facilities involved or exposed to this type of fire should be recognized as well as the possible impact on personnel safety. Brigade members should extinguish a Class B fire commensurate with the size of fire that they are or can be expected to extinguish at their facility.

A.6.3.5 Brigade members need to understand that most flammable gas fires have a high heat release, which impacts burning and exposed processes, equipment, and facilities. The potential for structural collapse of equipment and facilities involved or exposed to this type of fire should be recognized as well as the possible impact on personnel safety.

Brigade members also need to review specific flammable gases manufactured, stored, and used at their facilities, and the associated hazards (fire and explosion). Some flammable gas fires such as hydrogen can burn with an invisible flame, which creates a serious hazard to personnel.

A.6.3.6 Brigade members at sites that have dry chemical or carbon dioxide hose line systems will require specialized training to become competent in the use of these devices. The brigade member should be thoroughly knowledgeable in the proper operation of the system, how to activate the system, how to stop system flow, and procedures for restoring the system to full operational condition or reporting to the proper authority that the system has been discharged and needs to be returned to service by competent and authorized personnel. Furthermore, the brigade member should understand the proper application techniques and effects of air movement on these types of systems. Special procedures for utilizing these systems and standing by until the hazard is completely mitigated are paramount in effectively managing hazards protected by these systems.

Training in using these systems should cover all operational issues with the devices as well as discharging of these or similar systems so that members have a true understanding and feel for how to use these systems. Live fire training using similar devices to the plant system should be performed for accurate assessment of brigade members ability. Such fire training can be done on Class B fuels of at least 4.65 m^2 (50 ft^2) size and 76.2 mm (3 in.) depth. Emphasizing team approach and importance of back-up personnel is also essential.

A.6.3.7 There are facilities that employ fixed fire protection and detection systems, and thus the brigade member will be operating in concert with these systems. Understanding these systems and their uses and limitations will make the brigade more effective in handling emergency procedures. Because of the many different types of systems and number of facilities that do not have fixed fire protection systems, the requirements for training the brigade member are covered as a site-specific hazard.

For fixed detection systems for fire, the brigade member needs to understand the different types of systems on the site as well as signals generated by the system such as alarm, trouble, and supervisory. This understanding is important to determining how to respond to the appropriate situation upon arrival at the control panel or annunciation device. First arriving brigade members can then effectively communicate the indications on the control panel to other responding personnel per site procedures. As additional knowledge requirements, brigade members should be intimately familiar with system operations such as activate, silence, and reset procedures, as well as possibly releasing a specialized fire protection system such as deluge spray, FM200®, Inergen®, carbon dioxide, or foam.

For fixed gas detection systems, the brigade member should understand the different types of gas detection systems at the site. The brigade member should also understand the different signals of gas detection systems, which typically include low, medium, and high concentrations of gas as well as fault indications. Other important knowledge for brigade members is the understanding of the use of parts per million (ppm) reading and percent of lower flammable and explosive limit readings.

For portable gas monitoring devices, brigade members should be thoroughly trained in the safe use of these devices. Further, they should understand flammable and explosive atmospheres and readings. Lastly, they should have an understanding of areas that can accumulate gases and of proper entry and exit procedures.

A.6.3.8 Many sites have fixed fire suppression systems, including sprinkler systems, foam systems, total flooding and local application carbon dioxide systems, dry chemical systems, clean agent systems (e.g., FM200 and Inergen), and halon systems. These systems are installed to provide a first line of defense of fire protection of areas or specific equipment. Operating with these systems is essential to all industrial fire brigade members. Failure of a system to operate by automatic means can be cause for operating the equipment manually to achieve the desired result of fire control or extinguishment. Further, the shutting down of these systems prematurely can cause the fire to intensify and spread. In the case of the total flooding agents such as carbon dioxide, FM200, Inergen, and halon, interrupting the integrity of the enclosing structure can cause the system to be ineffective.

Brigade members should know how the specific systems at their site are intended to perform so that the brigade does not unintentionally interfere with the operation of these systems. The brigade member should know by which means they can control the system using electrical and mechanical means. Closing a valve or de-energizing a solenoid as well as performing the opposite functions to initiate the system can be one way to shut down a system. Understanding the system overrides such as bypasses, valve opening, and mechanical overrides of electrical devices will allow the brigade member to institute the system operation in the event of automatic system failure. A brigade member should also recognize that operating a damaged fixed fire protection system, such as one damaged by explosion, can create a more dangerous situation by wasting resources, for example, damaged piping flowing water away from the fire and depleting the water supply to other members or agencies working at the emergency.

Understanding the hazard associated with these systems is essential to brigade and personnel safety. Discharging carbon dioxide into an occupied area can be life threatening. Large-volume water flow from monitors or deluge systems can present injury hazards to personnel operating in the area of the discharge from both the effects of the agent as well as moving the fire and smoke into areas occupied by personnel.

A.6.3.9 See A.6.2.3.

A.6.3.10 Site-specific tools and equipment can include ropes, handlights, power tools, hand tools, power plants, portable lighting equipment, hose and hose accessories, salvage and overhaul tools and equipment, and special-purpose equipment such as special agent appliances.

A.7.1.2 See A.6.2.1.

A.7.1.2.2 See A.6.2.2.

A.7.2.1 Site-specific hazards should be identified and itemized for the industrial fire brigade, along with a detailed explanation of each hazard. Special hazards can involve operations or materials. Typical operations are data processing and electronic control equipment, where the discharge of a special extinguishing agent can present a hazard to the industrial fire brigade members; engine test areas; paint dip, mix, and storage rooms; spray booths; flammable liquid tank farms; machinery operations; energized electrical equipment; hazardous materials; and combustible dusts.

Fire hose should be in accordance with NFPA 1961, *Standard on Fire Hose.* Hose should be maintained in accordance with NFPA 1962, *Standard for the Care, Use, and Service Testing of Fire Hose Including Couplings and Nozzles.*

Hoseline should be commensurate with the size and type of fires that the members are expected to extinguish in their normal duties.

Radios can be used for communications on the fireground; however, they cannot be the sole tool for accounting for one's partner in the interior of a structure fire *(see 29 CFR 1910.134, "Respiratory Protection Standard").*

A.7.2.3 Some sites have fixed smoke removal systems already installed for ventilation of products of combustion. The management of the industrial fire brigade should ensure that appropriate education and training are provided on these systems.

A.7.2.4 The industrial fire brigade member should be able to recognize important evidence as to a fire's cause and maintain the evidence so that further testing can be done without contamination or chain-of-custody problems. Evidence should be left in place (when possible, otherwise chain of custody should be established); not altered by improper handling, walking, and so forth; and not destroyed. Possible means to protect evidence is to avoid touching, to protect with salvage covers during overhaul, or to rope off the area where the evidence lies. The industrial fire brigade member is not intended to be highly proficient at origin and cause determination.

A.7.2.5 Personnel accountability systems vary from site to site and should be incorporated into the site incident management system/standard operating procedures. When training exercises are intended to simulate emergency conditions, smoke-generating devices that do not create a hazard are required. Several accidents have occurred when smoke bombs or other smoke-generating devices that produce a toxic atmosphere have been used for training exercises.

A.7.2.6 See A.5.3.4.

A.7.3 See Annex D.

A.7.3.1 See A.6.3.7.

A.7.3.2 See A.6.3.8.

A.7.3.4 See A.6.3.4.

A.7.3.5 See A.6.3.5.

A.7.3.6 See A.6.3.6.

A.7.3.7 Site-specific tools and equipment can include ropes, hand lights, power tools, hand tools, power plants, portable lighting equipment, hose and hose accessories, salvage and overhaul tools and equipment, and special-purpose equipment such as special agent appliances.

A.7.3.9 Personnel accountability systems vary from site to site and should be incorporated into the site incident management system/standard operating procedures. This system should include the interface between the site personnel and the outside mutual aid personnel, recognizing that the personnel accountability system for the site can be different from that of the outside mutual aid.

A.8.2.2(A) Size-up includes the many variables that the industrial fire brigade leader collects from the time of the alarm, during response, and upon arrival, in order to develop an initial action plan to control an emergency incident. These observations can include structural type and occupancy, fire involvement, number of occupants, materials spilled or involved in fire, wind direction, topography, and other observations relevant to the incident.

A.8.2.3(B) This requirement takes into consideration the industrial fire brigade leader's ability to give orders, direct personnel, evaluate information, and allocate resources to respond to the wide variety of emergency situations the industrial fire brigade encounters.

A.8.2.4 One of the industrial fire brigade leader's primary responsibilities is safety during industrial fire brigade activities. This standard defines the minimum requirements for the industrial fire brigade leader. Applicable OSHA regulations define additional requirements for those who could be assigned those duties.

Annex B Industrial Fire Brigade Support Member

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

B.1 General considerations. When organizing an industrial fire brigade, management should take into consideration the need for specialized duties required in the event of a fire or related emergency. Personnel resources should be assigned to support the brigade to ensure that these duties are accomplished. These personnel are not fire brigade members but are personnel who perform specific duties to assist the operations of the fire brigade as part of the incident management system. Such actions performed in the cold zones do not require fire brigade training but specific training on the function being performed. Support functions are those functions that are beyond the normal duties assigned to employees as part of the facility emergency action plan.

B.2 Support area needs. Support personnel are not expected to perform manual fire suppression activities in the event of an emergency but are expected to perform only those specialized tasks for which they have been chosen. Some of these specialized assignments include the following.

B.2.1 Building evacuation. Support personnel are expected to perform specialized duties to ensure that personnel are safely evacuated from an enclosed structure or the facility in the event of fire. They are known as fire wardens or by a variety of other titles.

B.2.2 Sprinkler system control. Support personnel are assigned to perform specialized duties to ensure that control of the automatic sprinkler protection system within the fire area or the facility is maintained in the event of fire. They are known as sprinkler valve operators or by a variety of other titles.

B.2.3 Electrical power control. Support personnel are expected to perform specialized duties to ensure the control of electrical power within the fire area or the facility in the event of fire. They are known as electricians or by a variety of other titles.

B.2.4 Utility control. Support personnel are expected to perform specialized duties to ensure the control of plant utilities (e.g., heating, ventilation, and air conditioning, steam, water, liquefied petroleum or natural gas, and other liquid or vapor piping systems) within the fire area in the event of fire. They are known as utility control technicians or by a variety of other titles.

B.2.5 Process control. Support personnel are expected to perform specialized duties to ensure the control of process equipment within the fire area or the facility in the event of a fire. They are known as process operators or by a variety of other titles.

B.2.6 Fire pump operation. Support personnel are expected to perform specialized duties to ensure that stationary fire pumps are placed into operation or are operating properly in the event of fire. They are known as fire pump operators or by a variety of other titles.

B.2.7 Salvage. Support personnel are expected to perform specialized duties to ensure that actions are taken during and after manual fire suppression activities to minimize the resultant damage from the fire. They are known as salvage personnel or by a variety of other titles.

B.2.8 Traffic control. Support personnel are expected to perform specialized duties to ensure that control of foot and vehicular traffic in and around the fire area or the facility is maintained in the event of fire and to ensure that any responding agency is directed to the fire area. Facility security or other personnel who have been assigned to assist the fire brigade can accomplish these operations.

B.2.9 Escort. Support personnel are expected to escort fire brigade members or other emergency responders to the area of a fire without entering into the warm or hot zones.

Annex C Job Performance Requirements

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

C.1 Explanation of the standard 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 standard as a whole is a description of a job.

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:

(1) Task that is to be performed

(2) Tools, equipment, or materials that must be provided to successfully complete the task
(3) Evaluation parameters and/or performance outcomes

Table C.2 Example of a JPR

Component	Example
(1) Task	(1) Ventilate a pitched roof
(2) Tools, equipment, or materials	(2) Given an ax, a pike pole, an extension ladder, and a roof ladder
(3) Evaluation parameters and performance outcomes	(3) So that a 4 ft hole is created; all ventilation barriers are removed; ladders are properly positioned for ventilation; ventilation holes are correctly placed; and smoke, heat, and combustion by-products are released from the structure

C.2.1 The task to be performed. The first component is a concise, brief statement of what the person is supposed to do.

C.2.2 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.

C.2.3 Evaluation parameters and/or performance outcomes. This component defines how well one must perform each task for both the performer and the evaluator. The job performance requirements guide performance towards successful completion by identifying evaluation parameters and/or performance outcomes. This portion of the job performance requirements promotes consistency in evaluation by reducing the variables used to gauge performance.

C.2.4 In addition to these three components, the job performance requirements contain prerequisite knowledge and skills. Just as the term *prerequisite* suggests, these are the necessary knowledge and skills one must have prior to being able to perform the task. Prerequisite knowledge and skills are the foundation for task performance.

Once the components and prerequisites are put together, the job performance requirements might read as follows.

C.2.4.1 Example 1. The Fire Fighter I shall ventilate a pitched roof, given an ax, a pike pole, an extension ladder, and a roof ladder, so that a 4 ft hole is created, all ventilation barriers are removed, ladders are properly positioned for ventilation, and ventilation holes are correctly placed.

(A) Prerequisite knowledge. Pitched roof construction, safety considerations with roof ventilation, the dangers associated with improper ventilation, knowledge of ventilation tools, the effects of ventilation on fire growth, smoke movement in structures, signs of backdraft, and the knowledge of vertical and forced ventilation.

(B) Prerequisite skills. The ability to remove roof covering; properly initiate roof cuts; use the pike pole to clear ventilation barriers; use ax properly for sounding, cutting, and stripping; position ladders; and climb and position self on ladder.

C.2.4.2 Example 2. The Fire Investigator shall interpret burn patterns, given standard equipment and tools and some structural/content remains, so that each individual pattern is evaluated with respect to the burning characteristics of the material involved.

(A) Prerequisite knowledge. Knowledge of fire development and the interrelationship of heat release rate, form, and ignitability of materials.

(B) Prerequisite skill. The ability to interpret the effects of burning characteristics on different types of materials.

C.3 Examples of potential uses. 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 prerequisite knowledge and skills prior to job performance requirements evaluation. This might be through documentation review or testing.

Next, the candidate would 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").

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

Using example 1, a practical performance-based evaluation would measure one's ability to "ventilate a pitched roof." The candidate passes this particular evaluation if the standard was met; that is, a 4 ft hole was created, all ventilation barriers were removed, ladders were properly positioned for ventilation, ventilation holes were correctly placed, and smoke, heat, and combustion by-products were released from the structure.

For example 2, when evaluating the task "interpret burn patterns," the candidate could be given a written assessment in the form of a scenario, photographs, and drawings and then be asked to respond to specific written questions related to the JPR's evaluation parameters.

Remember, when evaluating performance, you must give the person the tools, equipment, or materials listed in the job performance requirements, for example, an ax, a pike pole, an extension ladder, and a roof ladder, 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 fire fighter to "ventilate a pitched roof" should be converted into a measurable instructional objective for use when teaching the skill. *[See Figure C.4(a).]*

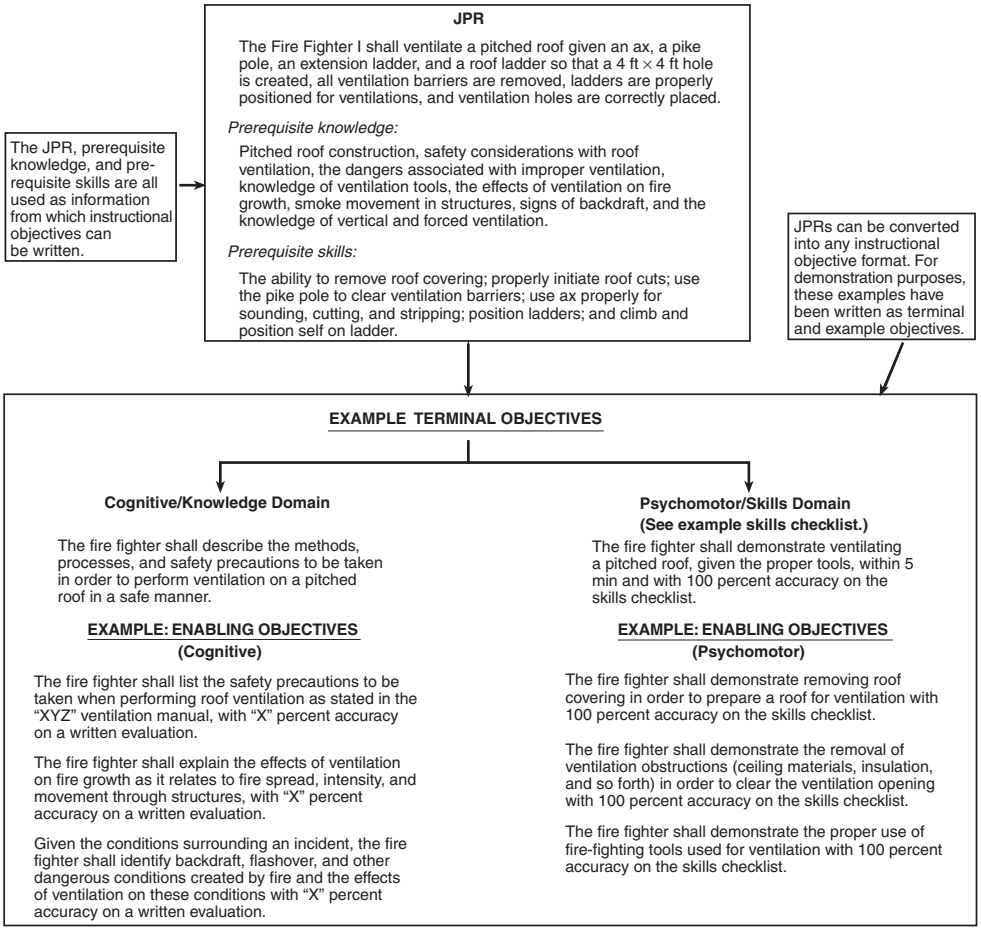

FIGURE C.4(a) Converting JPRs into instructional objectives.

Using example 1, a terminal instructional objective might read as follows: The learner will ventilate a pitched roof, given a simulated roof, an ax, a pike pole, an extension ladder, and a roof ladder, 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 job performance requirements.)

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

OBJECTIVE: The fire fighter shall demonstrate ventilating a pitched roof, given the proper tools, within 5 min and with 100 percent accuracy on the skills checklist.

YES	NO	
❑	❑	1. 4 ft × 4 ft hole was created.
❑	❑	2. All ventilation barriers were removed.
❑	❑	3. Ladders were properly positioned.
❑	❑	4. Ventilation holes were correctly placed (directly over fire, at highest point, and so forth).
❑	❑	5. Task completed within 5 min. (Time to complete task: _____)

FIGURE C.4(b) Skills checklist.

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 do at the end of a training session and are stated in behavioral terms that are measurable in the training environment.

By converting JPRs into instructional objectives, instructors will be able to clarify performance expectations and avoid confusion related to using statements designed for purposes other than teaching. Additionally, instructors will be able to add local/state/regional elements of performance into the standards as intended by the developers.

Prerequisite skills and knowledge should be converted into enabling objectives. These help to define the course content. The course content would include each of the prerequisite knowledge and skills. Using the above example, the enabling objectives would be pitched roof construction, safety considerations with roof ventilation, removal of roof covering, properly initiated roof cuts, and so on. This ensures that the course content supports the terminal objective.

It is assumed that the reader is familiar with curriculum development or training design and evaluation.