

NFPA® 1003

Standard for Airport Fire Fighter Professional Qualifications

2015 Edition



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NFPA® 1003

Standard for

Airport Fire Fighter Professional Qualifications

2015 Edition

This edition of NFPA 1003, *Airport Fire Fighter Professional Qualifications*, was prepared by the Technical Committee on Fire Fighter Professional Qualifications, and released by the Correlating Committee on Professional Qualifications. It was issued by the Standards Council on November 11, 2014, with an effective date of December 1, 2014, and supersedes all previous editions.

This edition of NFPA 1003 was approved as an American National Standard on December 1, 2014.

Origin and Development of NFPA 1003

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

The Committee on Fire Fighter Professional Qualifications met from 1976 to 1978 to produce the first edition of this document. Adopted by the Association in 1978, NFPA 1003 was the third in the series of fire fighter professional qualifications standards.

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

In the mid 1990's, all of the Pro-Qual standards were converted to the JPR format to be consistent with each other. Each JPR consists of the task to be performed; the tools, equipment, or materials that must be provided to complete the task; evaluation parameters and performance outcomes; and lists of the requisite knowledge and skills one must have to be able to perform the tasks.

The intent of the technical committee was to develop clear and concise JPRs that can be used to determine that an individual, when measured to the standard, possesses the skills and knowledge to perform as a job related to the particular standard.

Changes in the standard for the 2005 edition included the requirement that for certification as an airport fire fighter, the candidate meet the requirements for Fire Fighter II defined in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*. Also included were changes bringing the standard into conformance with the *Manual of Style for NFPA Technical Committee Documents*.

For the 2010 edition, a job-task analysis was completed by the committee to ensure that all the requirements were still relevant given the ever-changing world of ARFF. In addition, the committee, as directed by the Technical Correlating Committee, replaced the term *certified* with the term *qualified*. The committee added a skills maintenance requirement for ARFF personnel. The most significant change in the 2010 was the elimination of proximity personal protective equipment (PrPPE) from the minimum requirements. By setting the minimum at PrPPE, the standard had eliminated the ability of the AHJ to decide, given varying situations, whether PPE was acceptable versus PrPPE. The committee also removed Annex B from the document.

For the 2015 edition, the technical committee performed a job task analysis in collaboration with the Technical Committee on Aircraft Rescue and Fire Fighting ensuring that the position of Aircraft Rescue Fire Fighter was consistent with recognized trends within the industry. This analysis redefined the use of some airport apparatus to fire vehicles with handlines. The technical committee removed the job performance requirements for wheeled-extinguishers and mandatory response time, citing variables from airport to airport. Job performance requirements related to airport access were clarified.

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Committee Scope: This Committee shall have primary responsibility for the management of the NFPA Professional Qualifications Project and documents related to professional qualifications for fire service, public safety, and related personnel.

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Committee Scope: This Committee shall have primary responsibility for documents on professional qualifications required of fire fighters.



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NFPA 1003**Standard for****Airport Fire Fighter Professional
Qualifications****2015 Edition**

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

Chapter 1 Administration

1.1 Scope. This standard identifies the minimum job performance requirements (JPRs) for Airport Fire Fighters.

1.2* Purpose. The purpose of this standard is to specify the minimum job performance requirements (JPRs) for service as an Airport Fire Fighter.

1.2.1 This standard shall define Airport Fire Fighters.

1.2.2 The intent of this standard shall be to ensure that personnel serving as Airport Fire Fighters are qualified.

1.2.3* This standard shall not address organization or management responsibility.

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

1.2.5 JPRs for each level and position are the tasks personnel shall be able to perform in order to carry out the job duties.

1.2.6* Airport Fire Fighters shall remain current with the general knowledge and skills and JPRs addressed for each level or position of qualification.

1.3 Application. The application of this standard is to specify which requirements within the document shall apply to Airport Fire Fighters.

1.3.1 The JPRs shall be accomplished in accordance with the requirements of the authority having jurisdiction (AHJ) and all applicable NFPA standards.

1.3.2 It shall not be required that the JPRs be mastered in the order in which they appear. The AHJ shall establish instructional priority and the training program content to prepare personnel to meet the JPRs of this standard.

1.3.3* Performance of each requirement of this standard shall be evaluated by personnel approved by the AHJ.

1.3.4 The JPRs for each level or position shall be completed in accordance with recognized practices and procedures or as defined by law or by the AHJ.

1.3.5 Personnel assigned the duties of Airport Fire Fighters shall meet all the requirements defined in Chapter 4 prior to being qualified.

1.3.6 The AHJ shall provide personal protective clothing and the equipment necessary to conduct assignments.

1.3.7 JPRs involving exposure to products of combustion shall be performed in approved PPE.

1.3.8 Prior to training to meet the requirements of this standard, personnel shall meet the following requirements:

- (1) Educational requirements established by the AHJ
- (2) Age requirements established by the AHJ
- (3) Medical requirements established by the AHJ
- (4) Job-related physical performance requirements established by the AHJ

1.3.9 Wherever in this standard the terms *rules, regulations, policies, procedures, supplies, apparatus, or equipment* are referred to, it is implied that they are those of the AHJ.

1.4 Units. In this standard, equivalent values in SI units should not be considered as the requirement, as these values can be approximate. (See Table 1.4.)

Table 1.4 U.S.-to-SI Conversions

Quantity	U.S.	SI	Conversion Factor
	Unit/Symbol	Unit/Symbol	
Length	inch (in.)	millimeter (mm)	1 in. = 25.4 mm
	foot (ft)	meter (m)	1 ft = 0.305 m
Area	square foot (ft ²)	square meter (m ²)	1 ft ² = 0.0929 m ²

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.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, 2013 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2013 edition.

2.3 Other Publications.

2.3.1 IATA Publications. International Air Transport Association, 800 Place Victoria, P.O. Box 113, Montreal, Canada H4Z 1M1.



Dangerous Goods Manual/Regulations, 54th Edition, 2013.

2.3.2 Other Publications. *Merriam-Webster's Collegiate Dictionary*, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 402, *Guide for Aircraft Rescue and Fire-Fighting Operations*, 2013 edition.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 2014 edition.

NFPA 1000, *Standard for Fire Service Professional Qualifications Accreditation and Certification Systems*, 2011 edition.

NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, 2013 edition.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, 2014 edition.

NFPA 1031, *Standard for Professional Qualifications for Fire Inspector and Plan Examiner*, 2014 edition.

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 defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Shall. Indicates a mandatory requirement.

3.2.4 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Aircraft Accident. An occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and until all such persons have disembarked and in which any person suffers death or serious injury or in which the aircraft receives substantial damage. [403, 2014]

3.3.2 Aircraft Incident. An occurrence, other than an accident associated with the operation of an aircraft, that af-

fects or could affect continued safe operation if not corrected. [402, 2013]

3.3.3 Airport Fire Fighter. The Fire Fighter II who has demonstrated the skills and knowledge necessary to function as an integral member of an aircraft rescue and fire-fighting (ARFF) team.

3.3.4 Critical Rescue and Fire-Fighting Access Area. The rectangular area surrounding any runway within which most aircraft accidents can be expected to occur on airports. Its width extends 500 ft (150 m) from each side of the runway centerline, and its length is 3300 ft (1000 m) beyond each runway end. [402, 2013]

3.3.5 Dangerous Goods. Articles or substances that are capable of posing a significant risk to health, safety, or property when transported by air and that are classified and outlined in the International Air Transport Association (IATA) *Dangerous Goods Manual/Regulations*.

3.3.6 Fire Department. An organization providing rescue, fire suppression, and related activities, including any public, governmental, private, industrial, or military organization engaging in this type of activity. [1002, 2014]

3.3.7 Foreign Object Debris (FOD). FOD is any object, live or not, located in an inappropriate location in the airport environment that has the capacity to injure airport or air carrier personnel and damage aircraft.

3.3.8* Hazardous Area. For an aircraft, the area inside 75 ft (23 m) from any external surface of the aircraft.

3.3.9 Job Performance Requirement (JPR). A written 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, 2011]

3.3.10* National Defense Area. An area established on non-federal lands located in the United States, its territories, or its possessions for the purpose of safeguarding classified defense information or protecting Department of Defense (DOD) equipment, material, or both.

3.3.11* Personal Protective Equipment (PPE). Consists of full personal protective clothing, plus a self-contained breathing apparatus (SCBA) and a personal alert safety system (PASS) device. [1001, 2013]

3.3.12 Practical Critical Fire Area (PCA). This area is two-thirds of the Theoretical Critical Fire Area (TCA). [402, 2013] (See also 3.3.16, *Theoretical Critical Fire Area*.)

3.3.13 Requisite Knowledge. Fundamental knowledge one must have in order to perform a specific task. [1031, 2014]

3.3.14 Requisite Skills. The essential skills one must have in order to perform a specific task. [1031, 2014]

3.3.15 Task. A specific job behavior or activity. [1002, 2014]

3.3.16* Theoretical Critical Fire Area (TCA). The theoretical critical fire area (TCA) is a rectangle, the longitudinal dimension of which is the overall length of the aircraft, and the width includes the fuselage and extends beyond it by a predetermined set distance that is dependent on the overall width. Therefore, the aircraft length multiplied by the calculated width equals the size of the TCA. [402, 2013]

3.3.17 Zone. One of the sections of an area created for a particular purpose.

3.3.17.1* Cold Zone. The hazard-free area around an incident.

3.3.17.2* Hot Zone. The control zone immediately surrounding a hazardous materials incident that extends far enough to prevent adverse effects from hazardous materials releases to personnel outside the zone.

3.3.17.3* Warm Zone. The control zone at a hazardous materials incident site where personnel and equipment decontamination and hot zone support takes place.

Chapter 4 Airport Fire Fighter

4.1 General.

4.1.1 Qualifications. To be qualified as an airport fire fighter, the candidate shall meet the requirements for Fire Fighter II as defined in NFPA 1001 and the requirements for airport fire fighter defined in this standard.

4.1.1.1 Duties. These requirements shall be divided into three major duties: response, fire suppression, and rescue.

4.1.1.2 Function. The primary function of the airport fire fighter shall be to execute fire suppression and rescue activities.

4.1.1.3* General Knowledge Requirements. Fundamental aircraft fire-fighting techniques, including the approach, positioning, initial attack, and selection, application, and management of the extinguishing agents; limitations of various sized hand lines; use of personal protective equipment (PPE); fire behavior; fire-fighting techniques in oxygen-enriched atmospheres; reaction of aircraft materials to heat and flame; critical components and hazards of civil aircraft construction and systems related to ARFF operations; special hazards associated with military aircraft systems; a national defense area and limitations within that area; characteristics of different aircraft fuels; hazardous areas in and around aircraft; aircraft fueling systems (hydrant/vehicle); aircraft egress/ingress (hatches, doors, and evacuation chutes); hazards associated with aircraft cargo, including dangerous goods; hazardous areas, including entry control points, crash scene perimeters, and requirements for operations within the hot, warm, and cold zones; and critical stress management policies and procedures.

4.1.1.4 General Skills Requirements. Don PPE; operate hatches, doors, and evacuation chutes; approach, position, and initially attack an aircraft fire; select, apply, and manage extinguishing agents; shut down aircraft systems, including engine, electrical, hydraulic, and fuel systems; operate aircraft extinguishing systems, including cargo area extinguishing systems.

4.1.2 The job performance requirements of this chapter shall be accomplished in accordance with the requirements of the authority having jurisdiction and NFPA 1500.

4.2 Response. This duty involves the timely arrival at an incident or accident and the capability to perform emergency functions. The duty also includes responding to hazardous conditions and performing standby operations.

4.2.1 Respond to day and night incidents on and adjacent to the airport, given an assignment, operating conditions, a loca-

tion, a grid map, a vehicle, and a prescribed response time, so that the route selected and taken provides access to the site within the allotted time.

(A) Requisite Knowledge. Airport familiarization, including runway and taxiway designations, frangible gate locations, airport markings, lights, Instrument Landing System (ILS) critical areas, and critical rescue and fire-fighting access areas, recognize the impact of low-visibility conditions on movement areas and areas of response in and close to the airport; designated isolation areas; vehicular traffic controls on airfield; bridge load limits; controlled access points; aircraft traffic patterns and taxi routes; fuel storage and distribution locations; airport and immediate local area topographic layout, drainage systems, water supplies, airport facilities, and security.

(B) Requisite Skills. Read, interpret, and take correct action related to grid maps, water distribution maps, airport markings, and lights.

4.2.2 Communicate critical incident information regarding an incident on or adjacent to an airport, given an assignment involving an incident and an incident management system (IMS) protocol, so that the information provided is accurate for the incident commander.

(A) Requisite Knowledge. Incident management system (IMS) protocol, the airport emergency plan, airport and aircraft familiarization, communications equipment and procedures, and incident communications procedures.

(B) Requisite Skills. Operate communications systems, communicate an accurate situation report, implement incident management system (IMS) protocol and airport emergency plan, and recognize aircraft types.

4.2.3 Communicate with applicable air traffic control facilities, given a response destination on or adjacent to an airport and radio equipment, so that all required clearances are obtained.

(A) Requisite Knowledge. Airfield familiarization, airport operational procedures, avoiding runway/aircraft movement area incursion, communications equipment and frequencies, tower light signals, aviation terminology, and phonetic alphabet.

(B) Requisite Skills. Operate communications equipment and use aviation terminology and phonetic alphabet.

4.2.4* Perform an airport operation, given an assignment, a hazardous condition, and the airport policies and procedures, so that unsafe conditions are detected and reduced in accordance with the airport policies and procedures.

(A) Requisite Knowledge. Airport and aircraft policies and procedures for hazardous conditions.

(B) Requisite Skills. Recognize hazardous conditions and initiate corrective action.

4.3 Fire Suppression. This duty involves the attack, control, and extinguishment of fires involving aircraft, aircraft cargo, airport facilities, and other equipment related to airport operations and property conservation. The primary purpose of this duty is to protect lives and property.

4.3.1* Extinguish an aircraft fuel spill fire, given approved PPE, an assignment, agent application procedures, a fire-fighting vehicle hand line flowing a minimum of 95 gpm (359 L/min) of approved foam extinguishing agent, and a fire



sized to the flow rate used, so that the agent is applied using the prescribed techniques and the fire is extinguished as required by the AHJ.

(A) Requisite Knowledge. The fire behavior of aircraft fuels in pools, physical properties and characteristics of aircraft fuel, and agent application rates and densities.

(B) Requisite Skills. Operate fire streams and apply agent.

4.3.2* Extinguish an aircraft fuel spill fire, given an assignment, approved PPE, an ARFF vehicle turret flowing the approved minimum required flow, a fire sized to the approved flow rate used, and the procedures for agent application, so that the agent is applied according to procedures and the fire is extinguished as required by the AHJ.

(A) Requisite Knowledge. Operation of ARFF vehicle agent delivery systems, the fire behavior of aircraft fuels in pools, physical properties and characteristics of aircraft fuel, the procedures for agent application, and agent application rates and densities.

(B) Requisite Skills. Apply fire-fighting agents and streams using ARFF vehicle turrets.

4.3.3* Extinguish a three-dimensional aircraft fuel fire as a member of a team, given a team, approved PPE, an assignment, fire-fighting vehicle hand line(s) using primary and secondary agents, and agent application procedures, so that a dual-agent attack is used, the agent is applied according to procedures, the fire is extinguished, and the fuel source is secured.

(A) Requisite Knowledge. The fire behavior of aircraft fuels in solid, pressurized, and atomized states; physical properties and characteristics of aircraft fuel; advantages and limitations of agents; agent application rates and densities; agent application procedures; and methods of controlling fuel sources.

(B) Requisite Skills. Operate fire streams and apply agents, and secure fuel sources.

4.3.4* Attack a fire on the interior of an aircraft while operating as a member of a team, given a team, approved PPE, an assignment, a fire-fighting vehicle hand line, an extinguishing agent, and a ladder or other means of accessing the aircraft, so that team integrity is maintained, the attack line is deployed for advancement, ladders or other means are used, access is gained into the fire area, effective agent application practices are used, the fire is approached, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, hazards are avoided or managed, and the fire is brought under control.

(A) Requisite Knowledge. Techniques for accessing the aircraft interior according to the aircraft type, methods for advancing hand lines from a fire-fighting vehicle, precautions to be followed when advancing hose lines to a fire, observable results that a fire stream has been applied, dangerous structural 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, the role of the backup team in fire attack situations, attack and control techniques, and techniques for exposing hidden fires.

(B) Requisite Skills. Deploy fire-fighting vehicle hand line on an interior aircraft fire; gain access to aircraft interior; open, close, and adjust nozzle flow and patterns; apply agent using

direct, indirect, and combination attacks; advance charged and uncharged hose lines up ladders and up and down interior and exterior stairways; and locate and suppress interior fires.

4.3.5* Attack an engine or auxiliary power unit/emergency power unit (APU/EPU) fire on an aircraft while operating as a member of a team, given approved PPE, an assignment, fire-fighting vehicle hand line or turret, a correct agent, and agent application procedures, so that agent application procedures are followed, the fire is extinguished, and the engine or APU/EPU is shut down.

(A) Requisite Knowledge. Techniques for accessing the aircraft engines and APU/EPUs, operation of on-board aircraft fire-fighting systems and potential hazards, safety procedures, methods for advancing hand line from a fire-fighting vehicle, methods for operating turrets, and methods for shutting down engine and APU/EPU operation.

(B) Requisite Skills. Deploy and operate fire-fighting vehicle hand line, operate turrets, gain access to aircraft engine and APU/EPU, and shut down engine and APU.

4.3.6 Attack a wheel assembly fire, as a member of a team, given PPE, a team, an assignment, an ARFF vehicle hand line, and correct agent, so that the fire is extinguished.

(A) Requisite Knowledge. Agent selection and application procedure, special safety considerations, and the characteristics of combustible metals.

(B) Requisite Skills. Approach the fire in accordance with safety procedures, and select and apply agent.

4.3.7* Ventilate an aircraft through available doors and hatches while operating as a member of a team, given PPE, an assignment, tools, and mechanical ventilation devices, so that openings are created, all ventilation barriers are removed, and the heat and other products of combustion are released.

(A) Requisite Knowledge. Aircraft access points; principles, advantages, limitations, and effects of mechanical ventilation; the methods of heat transfer; the principles of thermal layering within an aircraft on fire; and the techniques and safety precautions for venting aircraft.

(B) Requisite Skills. Operate doors, hatches, and forcible entry tools; operate mechanical ventilation devices; and remove barriers.

4.3.8* Replenish extinguishing agents while operating as a member of a team, given an assignment, a fire-fighting vehicle, a fixed or mobile water source, a supply of agent, and supply lines and fittings, so that agents are available for application by the fire-fighting vehicle within the time established by the authority having jurisdiction (AHJ).

(A) Requisite Knowledge. Resupply procedures during an incident and operation procedures for fire-fighting vehicle replenishment.

(B) Requisite Skills. Connect hose lines and operate valves.

4.3.9 Preserve the aircraft accident scene, given an assignment and procedures, so that evidence is identified, protected, and reported according to procedures.

(A) Requisite Knowledge. Airport emergency plan requirements for preservation of the scene, evidence identification, evidence protection, and evidence reporting procedures.

(B) Requisite Skills. Preserve the scene for investigators, and identify, protect, and report evidence.

4.3.10* Overhaul the accident scene, given PPE, an assignment, hand lines, and property conservation equipment, so that all fires are located, exposed, and extinguished and all property is protected from further damage.

(A) Requisite Knowledge. Methods of complete extinguishment and prevention of re-ignition, reasons for conservation, operating procedures for property conservation equipment, overhaul procedures, signs of a hidden fire, methods of detecting hidden fires, and tools and equipment used for overhaul.

(B) Requisite Skills. Use property conservation equipment, detect hidden fires, and use tools and equipment to expose hidden fires.

4.4* **Rescue.** This duty involves gaining access to an aircraft and assisting in the evacuation process, performing disentanglement, and initial triage.

4.4.1* Gain access into and out of an aircraft through normal entry points and emergency hatches, secure and shut down the aircraft, and assist in the evacuation process while operating as a member of a team, given approved PPE and an assignment, so that passenger evacuation and rescue can be accomplished.

(A) Requisite Knowledge. Aircraft familiarization, including materials used in construction, aircraft terminology, automatic explosive devices, hazardous areas in and around aircraft, aircraft egress/ingress (hatches, doors, and evacuation chutes), military aircraft systems and associated hazards; capabilities and limitations of manual and power rescue tools and specialized high-reach devices, aircraft shutdown and safetying procedures.

(B) Requisite Skills. Operate power saws and cutting tools, hydraulic devices, pneumatic devices, and pulling devices; operate specialized ladders and high-reach devices; secure aircraft safety and shutdown.

4.4.2* Locate and disentangle an entrapped person from an aircraft as a member of a team, given approved PPE, a team, an assignment, and rescue tools, so that the person is freed from entrapment without undue further injury and hazards are managed.

(A) Requisite Knowledge. Capabilities and limitations of rescue tools, search procedures, hazard identification, and control methods.

(B) Requisite Skills. Perform search procedures, control hazards, remove victims, and operate rescue tools.

4.4.3 Implement initial triage of the victims of an aircraft accident, given PPE, an assignment, and the triage protocol of the AHJ, so that each victim is evaluated and correctly categorized according to protocol.

(A) Requisite Knowledge. Categories of triage according to the triage protocol of the AHJ, and methods of assessment.

(B) Requisite Skills. Triage patients per protocol.

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.1.2 The committee believes that this document specifies the minimum job performance requirements for Airport Fire Fighters. The committee recognizes that emergency services organizations might have to invest considerable resources to provide the equipment and training needed to perform safely and efficiently. The committee does not mean to imply that organizations with limited resources cannot provide response services, only that the individuals charged with performing responsibilities are qualified to specific levels according to this standard.

A.1.2.3 Organization or management responsibilities should be addressed by the agency that personnel represent. The authority having jurisdiction should define the agency requirements for progression to positions of management responsibility.

A.1.2.6 The committee recognizes the importance of formal and continuing education and training programs to ensure Airport Fire Fighters have maintained and updated the necessary skills and knowledge for the level of qualification. Continuing education and training programs can be developed or administered by local, state, provincial, or federal agencies as well as professional associations and accredited institutions of higher education. The methods of learning would include areas of technology, refresher training, skills practices, and knowledge application to standards. The subject matter should directly relate to the requirements of this standard.

A.1.3.3 It is recommended, where practical, that evaluators be individuals who were not directly involved as instructors for the requirement being evaluated.

A.3.1 Definitions of action verbs used in the job performance requirements in this document are based on the first definition of the word found in *Merriam-Webster's Collegiate Dictionary*, 11th edition.

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



A.3.3.8 Hazardous Area. The hazardous area can be adjusted by the incident commander, based on site conditions and risk analysis.

A.3.3.10 National Defense Area. Establishment of a national defense area temporarily places such nonfederal lands under the effective control of the Department of Defense and results only from an emergency event. The senior DOD representative at the scene will define the boundary, mark it with a physical barrier, and post warning signs. The landlord's consent and cooperation will be obtained whenever possible; however, military necessity will dictate the final decision regarding location, shape, and size of the national defense area.

A.3.3.11 Personal Protective Equipment (PPE). For fire fighters, approved personal protective equipment should meet the most recent edition of NFPA 1971, with self-contained breathing apparatus (SCBA) meeting NFPA 1981, and personal alert safety systems (PASS) meeting NFPA 1982.

A.3.3.16 Theoretical Critical Fire Area (TCA). The TCA is the theoretical area adjacent to an aircraft in which fire must be controlled for the purpose of ensuring temporary fuselage integrity and providing an escape area for its occupants.

The "Report of the Second Meeting of the ICAO Rescue and Fire Fighting Panel" (RFFP-II) was prepared with the benefit of large test fire experiments conducted by a member country aimed at estimating the size of the TCA (Geyer 1972). Geyer's study paid particular attention to the width on each side of the fuselage that would have to be secured to protect the aircraft's skin from melting under severe fire conditions. On the basis of the data presented in the resulting report, the RFFP agreed that the TCA should be a rectangle having as one dimension the overall length of the aircraft and the other dimension determined by the following:

- (1) For aircraft with an overall length of less than 65 ft (20 m), 40 ft (12 m) plus the width of the fuselage
- (2) For aircraft with an overall length of 65 ft (20 m) or more, 100 ft (30 m) plus the width of the fuselage

The theoretical critical area serves only as a means for categorizing aircraft in terms of the magnitude of the potential fire hazard in which they can become involved. It is not intended to represent the average, maximum, or minimum spill fire size associated with a particular aircraft. The original formulas for the maximum theoretical critical area, as presented in the RFFP-II report, were given as follows:

For U.S. units:

$$A_T = L \times (100 + w) \text{ where } L \geq 65 \text{ ft}$$

$$A_T = L \times (40 + w) \text{ where } L < 65 \text{ ft}$$

[A.3.3.16a]

For SI units:

$$A_T = L \times (30 + w) \text{ where } L \geq 20 \text{ m}$$

$$A_T = L \times (12 + w) \text{ where } L < 20 \text{ m}$$

where:

L = overall length of the aircraft

w = width of the aircraft fuselage

A_T = theoretical critical area (TCA)

The data analyzed by RFFP-II in its effort to respond to the issue of TCA versus practical critical area (PCA) appeared to indicate that the PCA was approximately two-thirds of the TCA. This had been verified by a study conducted by one of the member countries of actual spill fire sizes and aircraft accidents (Ansart 1970). Another analysis of aircraft rescue and fire-fighting operations had not included the study of the PCA

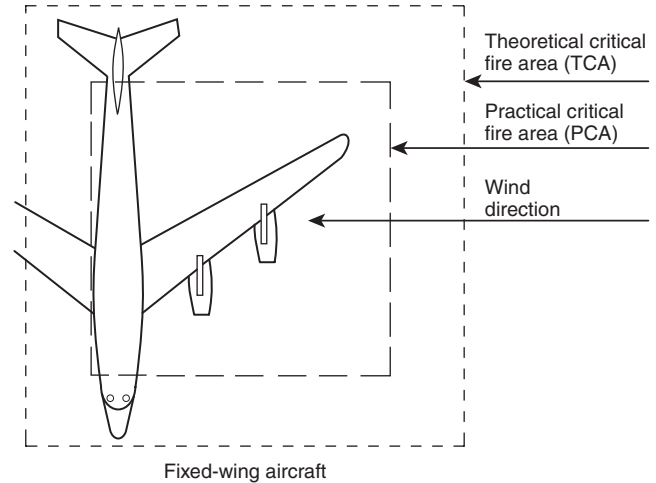


FIGURE A.3.3.16 Theoretical Critical Fire Area (TCA) Relative to Practical Critical Fire Area (PCA). [403: Figure B.2.1]

as compared to the TCA. However, that study did compare the actual amount of water used for foam at those accidents with the amounts recommended by RFFP-I. It was found that in 93 percent of accidents for which this information was available (99 cases out of 106), the amounts recommended by the Panel were in excess of those required in the actual aircraft accident. In light of this, the Panel decided to use two-thirds of the TCA as the PCA. (See Figure A.3.3.16 for a graphic display of this concept.) The formula for the PCA developed by RFFP-II for fixed-wing aircraft can be expressed as follows:

$$PCA = (0.67) \times (TCA) \quad [\text{A.3.3.16b}]$$

A.3.3.17.1 Cold Zone. The purpose of the cold zone is to ensure that there is an easily recognized boundary for arriving fire fighters and support personnel so that they do not impinge on the hazardous area, where SCBA and PPE are required. The secondary purpose of the cold zone is a distance sufficient for an initial hand line to reach the entrance of the aircraft interior.

A.3.3.17.2 Hot Zone. This zone is also referred to as the *exclusion zone* or the *restricted zone* in other documents.

A.3.3.17.3 Warm Zone. The warm zone includes control points for the decontamination corridor, thus helping to reduce the spread of contamination. This zone is also referred to as the *decontamination zone* or *limited access zone* in other documents.

A.4.1.1.3 Airport fire fighters should possess knowledge of military aircraft at those airports that accept military aircraft or at those airports that are co-located with a military installation with either separate or shared runways. This knowledge should include the following:

- (1) Military cargo/passenger aircraft
- (2) Military tanker aircraft
- (3) Military fighter/attack aircraft
- (4) Military helicopter aircraft
- (5) USAF Technical Order 00-105E-9, *Aerospace Emergency Rescue and Mishap Response Information (Emergency Services)*, contains specific information concerning aircraft rescue and fire fighting procedures and should be consulted prior to any attempt to perform rescue operations if

trained military specialists are not available for immediate assistance. USN/USMC aircraft information is located in NAVAIR 00-80R-14 and 00-80R-14-1. These documents contain specific information concerning fire fighting and rescue operations for aircraft in the military inventory. They specifically address the following:

- (a) Entry. If the emergency controls are activated, an explosive charge will explosively separate the canopy from the aircraft.
- (b) Ejection Systems. All fighter, bomber, and attack aircraft are equipped with ejection seats. Once access has been gained to the cockpit, caution is extremely important, because these ejection seats, when activated, are propelled out of the aircraft by an explosive charge. Airport fire fighters should not touch or activate any controls. Note that if a canopy or hatch has been separated from an aircraft, the ejection seat is automatically armed. Extreme caution must be exercised in crew removal.
- (c) Extrication. The aircrew member is secured to the seat by a series of straps, harnesses, and restraint belts. These restraints can be released by cutting if the release procedure is unknown.
- (d) Ordnance. Fighter and attack aircraft will have forward firing ordnance located in the forward part of the fuselage or wings.
- (e) Engine Shutdown. Engine shutdown usually can be accomplished by pulling T-handles, as on a commercial jet.

The NFPA *Aircraft Familiarization Charts Manual*, which contains complete diagrams of 115 types of aircraft, detailing their physical characteristics, is also helpful.

A.4.2.4 Hazardous conditions include foreign object debris (FOD), special fuels, fueling operations (grounding and bonding), welding operations, hazardous materials operations, corrosion control, fuel cell maintenance, and military operations.

A.4.3.1 The use of pressurized flammable gas or flammable liquid is acceptable for this simulation. Depending on the square footage of the local training simulators and the flow rate of the assigned application device, the specified time of extinguishment might need to be modified. When using simulators with lower square footage or different flow rates of agent application, the specified time of extinguishment will need to be proportional.

For example, a hand line flowing 95 gpm (359 L/min) would be required to extinguish a fire of 750 ft² in 90 seconds. The formula is $95 \text{ gpm} / 0.13 = 730$ fire square footage for 750 ft² (69.7 m²) fire with a flow rate at 359 L/min (95 gpm).

A.4.3.2 See A.4.3.1. For example, a candidate using a turret flowing 250 gpm (946 L/min) is required to extinguish a fire of 2067 ft² in 90 seconds for 2067 ft² (192 m²) fire with a flow rate at 250 gpm (946 L/min).

A.4.3.3 Three-dimensional or running fuel fires involve a fuel leak from an elevated or pressurized source. The fuel burns as it falls through the air, and, once on the ground, the burning fuel can pool or run across the ground surface. These fuel fires are extremely difficult to extinguish. They must be recognized and action must be taken to extinguish them early in the incident or accident for successful fire-fighting operations. Typically, these fires cannot be extinguished by smothering agents such as AFFF, because those agents cannot seal the

surface and exclude oxygen. Such fires are more successfully extinguished by shutting off the fuel flow or by using agents, such as dry chemicals, that interfere with the chemical or chain reaction.

A.4.3.4 This requirement can be met by using a structural burn facility that is configured to simulate the interior layout and dimensions of an aircraft fuselage and that contains mannequins to simulate victims. The mock-up should include at least three metal seats and training dummies to simulate victims. It is intended that the size of the aircraft be the largest type that normally uses the airport and that the hand line be appropriate to the size of the aircraft.

A.4.3.5 Shutting down the aircraft includes turning off engines/power units, electrical, and oxygen systems. Training and evaluation of engine/APU shut down and activation of on-board aircraft fire-fighting systems can be accomplished using simulation on actual aircraft or mock-ups.

A.4.3.7 Training and evaluation of this task can be accomplished using actual aircraft or mock-ups and smoke-generation devices used for training.

A.4.3.8 The replenishment task is time critical. Evaluating the proficiency of potential ARFF personnel to replenish the extinguishing agents on an ARFF vehicle requires that the AHJ evaluate several factors related to its own airport emergency plan in order to establish a fair benchmark for personnel. The following factors influence this time constraint:

- (1) Size of the ARFF vehicles' agent reservoirs
- (2) Available replenishment methods and their agent flow capacities
- (3) Proximity of replenishment means to the potential ARFF emergency locations in and around the airport

In making these evaluations, the AHJ must keep in mind that its overall objective is to ensure an adequate agent flow at the scene during an emergency. The following is an example of determining the replenishment time variable:

If the typical ARFF vehicle on the airport runway holds 1500 gal (5677 L) of water and 150 gal (568 L) of AFFF, the replenishment means is a fixed water hydrant located at the midway point of the runways. If a hydrant flow capacity is 250 gal (946 L/min) and if the average time to drive from the approach and departure end of any runway to the midpoint is 2 minutes, then a reasonable time to replenish a vehicle and return it to operation from the end of the runway is 18 minutes. This allows 2 minutes to drive to the hydrant, 4 minutes to connect to the hydrant, 7 minutes to fill the water tank, 3 minutes to disconnect from the hydrant, and 2 minutes to drive back to the end of the runway.

This might be considered a reasonable amount of time to replenish the vehicle at this particular airport, if additional vehicles are available to continue support at the emergency scene, but it might be entirely too slow for an airport where this ARFF vehicle is the only vehicle available to support an aircraft scene. In this case, the replenishment plan should be reevaluated and adjusted to reduce the time required.

A.4.3.10 It is known that during overhaul, many fire fighters remove their respiratory protective equipment and as a result, expose themselves to probable contamination by carcinogens, toxic substances, and so forth. Respiratory protective equipment should be worn during overhaul and all PPE should be washed down after exposure in any incident involving fire.



A.4.4 One of the primary tasks of rescue operations is for the airport fire fighter to maintain a habitable environment around the fuselage and to assist with aircraft evacuation by stabilizing slide chutes and assisting and controlling the evacuees.

A.4.4.1 Securing the aircraft can include chocking/pinning the landing gear, safety ejection/ballistic chute systems, canopies, and safety weapons systems. Shutting down the aircraft includes turning off engines/power units, electrical, and oxygen systems. Training and evaluation of these tasks can be accomplished using simulation on actual aircraft or mock-ups.

A.4.4.2 Training and evaluation of this task can be accomplished using actual aircraft or mock-ups.

Annex B Explanation of the Professional Qualifications Standards and Concepts of JPRs

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

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

NFPA professional qualifications standards identify the minimum job performance requirements (JPRs) for specific emergency services levels and positions. The standards can be used for training design and evaluation; certification; measuring and critiquing on-the-job performance; defining hiring practices; job descriptions; and setting organizational policies, procedures, and goals.

Professional qualifications standards for specific jobs are organized by major areas of responsibility defined as “duties.” For example, the fire fighter’s duties might include fire department communications, fireground operations, and preparedness and maintenance, whereas the fire and life safety educator’s duties might include education and implementation, planning and development, and evaluation. Duties are major functional areas of responsibility within a specific job.

The professional qualifications standards are written as JPRs. JPRs describe the performance required for a specific job and are grouped according to the duties of the job. The complete list of JPRs for each duty defines what an individual must be able to do in order to perform and achieve that duty.

B.2 The Parts of a JPR.

B.2.1 Critical Components. The JPR comprises three critical components, which are as follows:

- (1) Task to be performed, partial description using an action verb
- (2) Tools, equipment, or materials that are to be provided to complete the task
- (3) Evaluation parameters and performance outcomes

Table B.2.1 gives an example of the critical components of a JPR.

B.2.1.1 The Task to Be Performed. The first component is a concise statement of what the individual is required to do. A significant aspect of that phrase is the use of an action verb, which sets the expectation for what is to be accomplished.

Table B.2.1 Example of a JPR

(1) Task to be performed	(1) Perform overhaul at a fire scene,
(2) Tools, equipment, or materials	(2) given approved PPE, attack line, hand tools, flashlight, and an assignment,
(3) Evaluation parameters and performance outcomes	(3) so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

B.2.1.2 Tools, Equipment, or Materials That Must Be Provided for Successful Completion of the Task. This component ensures that all individuals completing the task are given the same tools, equipment, or materials when they are being evaluated. Both the individual and the evaluator will know what will be provided in order for the individual to complete the task.

B.2.1.3 Evaluation Parameters and Performance Outcomes. This component defines — for both the performer and the evaluator — how well the individual should perform each task. The JPR guides performance toward successful completion by identifying evaluation parameters and performance outcomes. This portion of the JPR promotes consistency in evaluation by reducing the variables used to gauge performance.

B.2.2 Requisite Knowledge and Skills. In addition to these three components, the JPR describes requisite knowledge and skills. As the term *requisite* suggests, these are the necessary knowledge and skills the individual should have prior to being able to perform the task. Requisite knowledge and skills are the foundation for task performance.

B.2.3 Examples. With the components and requisites combined, a JPR might read similar to the following two examples.

B.2.3.1 Example: Fire Fighter I. Perform overhaul at a fire scene, given approved PPE, attack line, hand tools, 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. Knowledge of types of fire attack lines and water application devices 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, 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; remove flooring, ceiling, and wall components to expose void spaces without compromising structural integrity; apply water for maximum effectiveness; expose and extinguish hidden fires in walls, ceilings, and subfloor spaces; recognize and preserve signs of area of origin and arson; and evaluate for complete extinguishment.

B.2.3.2 Example: Fire and Life Safety Educator II. Prepare a written budget proposal for a specific program or activity, given budgetary guidelines, program needs, and delivery ex-

pense projections, so that all guidelines are followed and the budget identifies all program needs.

(A) Requisite Knowledge. Knowledge of budgetary process; governmental accounting procedures; federal, tribal, state, and local laws; organizational bidding process; and organization purchase requests.

(B) Requisite Skills. The ability to estimate project costs; complete budget forms; requisition/purchase orders; collect, organize, and format budgetary information; complete program budget proposal; and complete purchase requests.

B.3 Potential Uses for JPRs.

B.3.1 Certification. JPRs can be used to establish the evaluation criteria for certification at a specific job level. When used for certification, evaluation should be based on the successful completion of the JPRs.

The evaluator would verify the attainment of requisite knowledge and skills prior to JPRs evaluation. Verification could be through documentation review or testing.

The individual seeking certification would be evaluated on completion of the JPRs. The individual would perform the task and be evaluated based on the evaluation parameters and performance outcomes. This performance-based evaluation is based on practical exercises for psychomotor skills and written examinations for cognitive skills.

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

Performance evaluation requires that individuals be given the tools, equipment, or materials listed in the JPR in order to complete the task.

B.3.2 Curriculum Development and Training Design and Evaluation. The statements contained in this document that refer to job performance were designed and written as JPRs. Although 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 skills on the job, as opposed to a learning situation. These statements should be converted into instructional objectives with behaviors, conditions, and degree to be measured within the educational environment.

While the differences between JPRs and instructional objectives are subtle in appearance, their purposes differ. JPRs state what is necessary to perform the job in practical and actual experience. Instructional objectives, on the other hand, 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 would be able to clarify performance expectations and avoid confusion caused by the use of statements designed for purposes other than teaching. Instructors would be able to add jurisdictional elements of performance into the learning objectives as intended by the developers.

Requisite skills and knowledge could be converted into enabling objectives, which would help to define the course content. The course content would include each item of the req-

uisite knowledge and skills, ensuring that the course content supports the terminal objective.

B.3.2.1 Example: Converting Fire Fighter I JPR into an Instructional Objective. The instructional objectives are just two of several instructional objectives that would be written to support the terminal objective based on the JPR.

JPR: Perform overhaul at a fire scene, given approved PPE, attack line, hand tools, 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.

Instructional Objective (Cognitive): The Fire Fighter I will identify and describe five safety considerations associated with structural integrity compromise during overhaul as part of a written examination.

Instructional Objective (Psychomotor): The Fire Fighter I will demonstrate the designed use of tools and equipment during overhaul to locate and extinguish hidden fires without compromising structural integrity.

B.3.2.2 Example: Converting Fire and Life Safety Educator II JPR into an Instructional Objective. The instructional objectives are just two of several instructional objectives that would be written to support the terminal objective based on the JPR.

JPR: Prepare a written budget proposal for a specific program or activity, given budgetary guidelines, program needs, and delivery expense projections, so that all guidelines are followed and the budget identifies all program needs.

Instructional Objective (Cognitive): The Fire and Life Safety Educator II will list and describe the bidding process for the purchase of a published program using budgetary guidelines, program needs, and the guidelines established by local organizational procedures as part of a written examination.

Instructional Objective (Psychomotor): The Fire and Life Safety Educator II will lead in the purchase of a specific fire and life safety educational program by following the bidding process to completion, using local organizational guidelines, including budgetary procedures, program needs, and delivery expense projections.

B.4 Other Uses for JPRs. While the professional qualifications standards are used to establish minimum JPRs for qualification, they have been recognized as guides for the development of training and certification programs, as well as a number of other potential uses.

These areas might include the following:

- (1) *Employee Evaluation/Performance Critiquing.* The professional qualifications standards can be used as a guide by both the supervisor and the employee during an evaluation. The JPRs for a specific job define tasks that are essential to perform on the job, as well as the evaluation criteria to measure completion of the tasks.
- (2) *Establishing Hiring Criteria.* The professional qualifications standards can be helpful in a number of ways to further the establishment of hiring criteria. The authority having jurisdiction (AHJ) could simply require certification at a specific level, for example, Fire Fighter I. The JPRs could also be used as the basis for pre-employment screening to establish essential minimal tasks and the related evaluation criteria. An added benefit is that individuals interested in employment can work toward the minimal hiring criteria at local colleges.
- (3) *Employee Development.* The professional qualifications standards can be practical for both the employee and the em-

ployer in developing a plan for the employee's growth within the organization. The JPRs and the associated requisite knowledge and skills can be used as a guide to determine additional training and education required for the employee to master the job or profession.

- (4) *Succession Planning*. Succession planning addresses the efficient placement of individuals into jobs in response to current needs and anticipated future needs. A career development path can be established for targeted employees to prepare them for growth within the organization. The JPRs and requisite knowledge and skills could then be used to develop an educational path to aid in the employee's advancement within the organization or profession.
- (5) *Establishing Organizational Policies, Procedures, and Goals*. The professional qualifications standards can be functional for incorporating policies, procedures, and goals into the organization or agency.

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