



**AIRCRAFT FIRE PROTECTION FOR  
MILITARY OPERATIONS OTHER THAN WAR  
(MOOTW)**

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This pamphlet provides guidance to planners for determining the minimum number of aircraft rescue and fire fighting (ARFF) vehicles and capabilities necessary to provide limited protection to Air Force aircraft during military operations other than war (MOOTW) to include Expeditionary Air Force (EAF), small scale conflict, and non-combat type operations. This determination is based on the type, size, and number of aircraft being protected. Applicable Air Force ARFF vehicle sets and requirements are found in Allowance Standard 019 and National Fire Protection Association (NFPA) standards. The capabilities outlined only provide fire suppression forces and do not include conventional fire command and control element, dedicated rescue team, or structural fire suppression capability.

**1. Responsibility.** The airlift user normally provides fire protection manpower and equipment at locations other than established Air Force active/flying installations. If the airlift user cannot provide the minimum protection presented in **table 1.**, the user can request support through the airlift provider major command Director of Operations (MAJCOM/DO). In this case, the user may be responsible for providing funding, unless otherwise approved by the MAJCOM/DO.

**2. Minimum Fire Protection Capabilities.** Minimum fire protection capabilities in this pamphlet are based on Operational Risk Management (ORM) principles, as described in **attachment 2.** Table 1 provides a fire protection baseline for short-duration operations of 120 days or less. These minimum fire protection resources reduce the risk to aircrew and aircraft to the level outlined in **table a2.2.** For operations exceeding 120 days, fire protection requirements must be reevaluated to determine if they need to meet either wartime or peacetime requirements. The evaluation should also consider the need to add rescue or structural protection capability. The theater commander is responsible for this evaluation, with advice from the responsible theater civil engineer and/or fire protection representative. Host location fire protection capabilities should also be included when determining fire protection requirements. Peacetime and wartime fire protection requirements are identified in Air Force Manning Standard, Vehicle Allowance Standard 019, and the Air Force War and Mobilization Plan 1, Vol 1, Annex S, Appendix 5. Contingency

planners should refer to these publications when determining the appropriate levels of fire protection. Exceptions for reduced MOOTW aircraft operations can be found in paragraph 3 of this pamphlet.

2.1. Fire fighting and rescue capabilities will be extremely limited when resources less than those identified in Air Force War and Mobilization Plan 1, Vol 1, Annex S, Appendix 5, are provided. Vehicles and personnel shown in Table 1 provide an extremely limited capability to assist crewmember evacuation or sustained fire fighting operations. Aircrews operating at deployed locations must be made aware of the increased risk as a result of limited fire protection capabilities (refer to **table a2.2.**).

2.2. The type/number of aircraft supported and the number of landings and takeoffs determine the number of ARFF vehicles and associated staffing.

2.3. To use Table 1, match the aircraft type from **table a2.1.** with the appropriate NFPA category/ARFF set. The numbers below the vehicle set identify the expected maximum (aircraft) on ground (MOG) at the deployed location. For example, the C-9 type aircraft is assigned vehicle set 2. With an expected MOG of three, the minimum acceptable capability is two P-19 ARFF vehicles and six firefighters per twelve-hour operational shift.

**NOTE:** The MAJCOM civil engineer establishes capabilities for operations not specified in Table 1.

**Table 1. Recommended Minimum ARFF Vehicles and Staffing for MOOTW Fire Protection.**

NFPA Aircraft Category/Air Force ARFF Vehicle Set				Recommended Staffing*	Recommended Minimum ARFF Vehicles**
4/1	7/2	8/3	9/4 and 10/5		
<b>Maximum on Ground (MOG)</b>					P-19 or P-XX
1-12				3	1 (see paragraph 2.3.4)
13+	1-3	1-3		6	2
	4+		1-2	9	3
		4-8		12	4
		9+	3+	15	5

\*Staffing must be doubled for 24-hour operations. P-XX vehicles will require three personnel per vehicle during MOOTW operations, due to the lack of rescue vehicle support.

\*\*MOOTW operations requiring two or more ARFF vehicles require a minimum of two ARFF vehicles, regardless of total gallons.

2.3.1. When water supplies are limited or nonexistent, increase number of vehicles by one P-18 water tanker and two additional firefighters for 24-hour operations.

2.3.2. Table 1 does not consider structural or tent city fire protection. If needed, structural fire protection can be provided by adding a P-18, -22, -24, or -27 structural fire fighting vehicle with appropriate staffing.

2.3.3. AFI 11-299V1, *Nuclear Airlift Operations*, specifies a minimum of one Air Force P-4, -19, or -XX and staffing (or equivalent) for sites where aircraft carrying special weapons are being operated, loaded, or unloaded (regardless of the number of equivalent takeoffs and landings).

2.3.4. For C-21s, C-12s, or similar non-fighter aircraft, one quick response ARFF vehicle (Air Force P-20 or civilian equivalent rapid intervention vehicle) with at least 500 pounds of dry chemical extinguishing agent or 450 pounds of dry chemical and 50 gallons of water for aqueous film forming foam (AFFF) can provide protection in lieu of a P-19.

2.3.5. When operating at locations with more than one type of aircraft, the larger ARFF requirement applies.

2.4. The severe MOOTW fire suppression agent capabilities outlined in Table A2.1 represent a severe increase in risk to aircrew, aircraft, and fire fighters when compared to the NFPA minimum acceptable capabilities. Table A2.1 also presents a safer alternative under the MOOTW greater risk/loss column, which is based on Table A2.2, the risk decision matrix.

**3. Exceptions.** Additional fire protection is not normally required for infrequent flying operations, including:

3.1. Aircraft Category 10, 9, or 8 (see **table a2.1.**): Not more than two equivalent takeoffs and two landings within fourteen consecutive days.

3.2. Aircraft Category 7 or Smaller (see **table a2.1.**): Not more than four equivalent takeoffs and four landings within fourteen consecutive days.

**NOTE:** Recommended vehicle capabilities presented in **table 1.** do not apply to helicopter landing zones (LZ) or forward area rearming and refueling point (FARRP) operations.

#### **4. Waivers.**

4.1. Authority. The airlift provider MAJCOM/DO or ANG/DO may grant waivers for operations with fire protection less than specified in **table 1.** For exercises and contingency operations, the Director of Mobility Forces (DIRMOBFOR) and the Joint Force Air Component Commander (JFACC) may waive ARFF requirements. When time does not permit formal (written) waiver action, the MAJCOM/DO (waiver authority) files an after-action summary. The MAJCOM/DO provides information copies of all waivers to the MAJCOM Fire Protection Office.

4.2. Content of Waiver Requests. A waiver request should include:

4.2.1. Date (s) and type of operation.

4.2.2. Type of aircraft involved.

4.2.3. MOG.

4.2.4. A description of available ARFF vehicles, including dedicated manpower and water/foam/chemical capabilities per vehicle.

4.2.5. A mission impact statement that includes appropriate remarks concerning unusual risk factors and/or facility conditions.

**NOTE:** A waiver for the first aircraft landing or and the last aircraft departure from the airfield is not required, when these aircraft are carrying ARFF equipment

4.3. LZ/Airfield Used for Unilateral Aircrew Training. If fire protection capabilities specified in Table 1 are not available, submit a waiver request in accordance with paragraph 4.1. Include a

description of the LZ/airfield. If approved, the waiver will remain in effect until the next required survey, unless the waiver influencing factors change, or become void, and/or the operation is extended.

JOHN W. HANDY, Lieutenant General, USAF  
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## Attachment 1

## GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

*References*

AFPD 11-2, *Aircraft Rules and Procedures*

AFI 11-299V1, *Nuclear Airlift Operations*

Allowance Standard 019, *Vehicle Fleet (Registered) All MAJCOM Common*

Air Force War and Mobilization Plan 1, Volume 1, Annex S, Appendix 5

NFPA 403, *Standard for Aircraft Rescue and Fire Fighting Services at Airports*

*Abbreviations and Acronyms*

**AFCESA**—Air Force Civil Engineer Support Agency

**AFFF**—Aqueous Film Forming Foam

**AFI**—Air Force Instruction

**AFPD**—Air Force Policy Directive

**ANG/DO**—Air National Guard Director of Operations

**ARFF**—Aircraft Rescue and Fire Fighting

**DIRMOBFOR**—Director of Mobility Forces

**FARRP**—Forward Area Rearming And Refueling Points

**HQ AFCESA/CEXF**—Office of the Chief, Air Force Fire Protection

**JFACC**—Joint Forces Air Component Commander

**LZ**—Landing Zone

**MAJCOM/DO**—Major Command Director of Operations

**MOG**—Maximum on Ground

**MOOTW**—Military Operations Other Than War

**NFPA**—National Fire Protection Association

**ORM**—Operational Risk Management

*Terms*

**Aircraft Rescue Fire Fighting Vehicle (ARFF)**—An approved vehicle capable of carrying fire fighting personnel and equipment and capable of dispensing (through turrets and handlines) the appropriate on-board extinguishing agents at the scene of an aircraft emergency. The following ARFF vehicles are air transportable by C-130, C-141, C-17, or C-5 aircraft:

**P-19**—1000-gallon capacity ARFF vehicle. Air Force's primary contingency crash vehicle.

**P-4**—1500-gallon capacity ARFF vehicle. Currently being phased out of the Air Force inventory. A suitable substitute, when available, for a P-19.

**P-XX**—1500-gallon capacity ARFF vehicle. New vehicle currently being phased into the Air Force inventory. A suitable substitute, when available, for a P-19.

**Fixed Wing Landing Zone**—An airfield or prepared area designated for training or employment. Includes areas where low-altitude parachute extractions (LAPES) may be performed.

**Forward Area Rearming and Refueling Point (FAARP)**—A ground site designated for quick rearming/refueling.

**Maximum on Ground (MOG)**—For purposes of this pamphlet, the greatest number of aircraft that are on the ground at any time requiring simultaneous support (for example, onload/offload, servicing, maintenance).

**Military Operations Other Than War (MOOTW)**—Operations that encompass the use of military capabilities across the range of military operations short of war. These military actions can be applied to complement any combination of the other instruments of national power and occur before, during, and after war.

**NFPA**—National Fire Protection Association. A national organization that publishes national consensus standards known as National Fire Codes.

**P-18**—2000-gallon capacity water tanker. Normally used for resupply of ARFF vehicles at locations without adequate water supplies. Can also provide limited structural fire protection capability.

**P-22**—Two wheel drive structural fire fighting pumper. Normally used to provide structural fire protection capability at locations with adequate water supplies or hydrant systems.

**P-24**—Four wheel drive structural fire fighting pumper. Normally used to provide structural fire protection capability at locations with adequate water supplies or hydrant systems.

**P-27**—Four wheel drive structural fire fighting mini-pumper. Normally used to provide limited structural fire protection capability at locations with adequate water supplies or hydrant systems.

**Rotary Wing (Helicopter) Landing Zone**—An area of sufficient size to allow insertion or extraction of personnel/equipment by touchdown and/or hover.

## Attachment 2

## OPERATIONAL RISK MANAGEMENT (ORM) MATRIXES

**A2.1.** The NFPA Standard 403 Q factors were considered when determining the fire suppression capability needed for MOOTW operations.

A2.1.1. NFPA minimum acceptable fire protection capability represents the amount of agent needed to meet NFPA Standard 403 requirements.

A2.1.2. MOOTW Greater Risk/Loss fire protection capability represents the amount of agent needed to provide initial fire control and handline operations to support limited interior fire fighting and rescue operations. This level of protection represents an increased risk/loss potential over the amount of fire protection capability provided using NFPA standard 403 minimum acceptable levels of agent and capabilities.

A2.1.3. MOOTW Severe Risk/Loss fire protection capability represents the amount of agent needed to provide initial one-minute fire control in the practical fire area. This level of protection represents a severe risk/loss potential over the amount of fire protection capability provided at home station.

**A2.2.** Table A2.1 identifies recommended fire suppression agents based on Air Force aircraft categories for NFPA minimum acceptable (normal day-to-day operations), MOOTW greater (increased risk/loss), and MOOTW severe (greatest risk/loss) fire protection capabilities.

**Table A2.1. Aircraft Category/Fire Fighting Agents.**

NFPA Aircraft Category	Air Force Vehicle Set	Typical Air Force Aircraft (paragraph A2.2.3)	NFPA Minimum Acceptable	MOOTW Greater Risk/Loss (paragraph A2.2.1)	MOOTW Severe Risk/Loss (paragraph A2.2.2)
10	5	C-5A/B, B-2,* VC-25*	11764 gallons	5698 gallons	3194 gallons
9	4	E-4, MD-11, 747, 777, KC-10*	9570 gallons	5122 gallons	2618 gallons
8	3	B-1, B-52, C-17, C-141, E-3A, KC/EC-135, 767, C-727, AC-130*	7778 gallons	4597 gallons	2095 gallons
7	2	C-9, C-20, C-130, T-43, MH-53, 737, MD-80, MC-130	4877 gallons	2836 gallons	1584 gallons
4	1	A-10, F-15, F-16, F-22, FB-111, F-117, T-1, T-37, T-38, T-39, C-12, C-21, C-27, other rotary wing not listed above	1335 gallons	1066 gallons	465 gallons

\*Indicates Air Force aircraft placed in higher aircraft category due to unique MAJCOM requirements.

A2.2.1. As the number of aircraft increases (see **table 1.**), fire protection capability should be increased from severe risk/loss to greater risk/loss or NFPA minimum acceptable levels of protection, as outlined in table A2.1.

A2.2.2. Severe Risk/Loss MOOTW fire protection represents greatest risk to aircraft, aircrew, and fire fighters. This level of protection is necessary before MOOTW operations start and when a small number of aircraft are participating in the MOOTW operation.

A2.2.3. For aircraft not listed in Table A2.1, apply aircraft category requirements in NFPA 403 and AS 019 to determine aircraft category/Air Force vehicle set.

**A2.3.** Table A2.2 is a decision matrix showing the probability of success when less than NFPA minimum acceptable fire protection capability is provided and MOOTW fire protection personnel are faced with a variety of emergency scenarios.

**NOTE:** For 24-hour-per-day operations, double the number of personnel.

**Table A2.2. Risk Decision Matrix.**

Personnel Provided →	3	6	9	12	15
P-19 Vehicle(s) Provided →	1	2	3	4	5
Fire Fighting Agent Provided →	1000 gal	2000 gal	3000 gal	4000 gal	5000 gal
Barrier Operations	R	R	Y	Y	G
Aircraft - Wheel/Brake/Engine Fires	G	G	G	G	G
Aircraft-Interior Electrical Fire	R	Y	G	G	G
Crash with Fuel Spill Fire - NFPA Category 1 to 4 Aircraft	R	Y	G	G	G
Crash with Fuel Spill Fire - NFPA Category 7 & 8 Aircraft	R	R	R	Y	Y
Crash with Fuel Spill Fire - NFPA Category 9 & 10 Aircraft	R	R	R	R	R
Rescue - Fighters - NFPA Category 1 to 4 Aircraft	Y	G	G	G	G
Rescue- Medium Frame - NFPA Category 7 & 8 Aircraft	R	R	R	Y	Y
Rescue - Large Frame - NFPA Category 9 & 10 Aircraft	R	R	R	Y	Y
Aircraft Standby	Y	Y	G	G	G

Legend:

G (Green) = Reasonable expectation fire fighting forces will be successful at interior/exterior aircraft fire suppression and rescue of aircrew.

Y (Yellow) = Interior/exterior aircraft rescue or fire suppression capability is severely limited. Fire fighting forces can still be expected to fight and control exterior fires in such a manner as to maintain a rescue path for one minute. Aircrew must exit under their own power; attempted rescue of trapped personnel severely endangers rescuers.

R (Red) = Fire fighting forces cannot be expected to be successful in interior aircraft fire suppression/rescue operations. Fire fighting forces can perform only limited exterior fire suppression. Aircrew must exit under their own power; rescue of trapped personnel should not be expected.

A2.3.1. When fire suppression resources are not green (see Table A2.2.) the Fire Chief or senior fire fighter must ensure fire ground operations are conducted in a manner to take full advantage of the limited capability on hand. Agent conservation will maximize the opportunity for rescue and containment. Commanders should consider curtailing high-risk activities anytime fire fighting capability is not green.