

Chapter 14 Firefighting Equipment

Introduction

The agency wildland fire program equipment resources include engines, dozers, water tenders, and other motorized equipment for fire operations.

Policy

Each state/region will comply with established standards for training, equipment, communications, organization, and operating procedures required to effectively perform arduous duties in multi-agency environments and various geographic areas.

Firefighting Engine/Water Tender Common Standards

Driving Standard

Refer to driving standards in chapter 7.

- *BIA* – Refer to chapter 6 for BIA-specific motor vehicle policies. BIA and DOI policies require all personnel who operate a vehicle with a gross vehicle weight (GVW) over 26,000 pounds to have a valid commercial driver's license (CDL).

Engine/Tactical Water Tender Water Reserve

Engine/tactical water tender operators will maintain at least 10 percent of the pumpable capacity of the water tank for emergency engine protection and drafting.

Chocks

At least one set of wheel chocks will be carried on each engine/water tender and will be properly utilized whenever the engine is parked or left unattended. This includes engine/water tender operation in a stationary mode without a driver “in place.”

Fire Extinguisher

All engines/water tenders will have at least one 5 lb. (minimum), ABC-rated fire extinguisher, either in full view or in a clearly marked compartment.

Nonskid Surfaces

All surfaces will comply with National Fire Protection Association (NFPA) 1906 Standard for Wildland Fire Apparatus requirements.

First Aid Kit

Each engine/water tender shall carry, in a clearly marked compartment, a fully equipped 20–25-person first aid kit.

- *BLM* – Fire First Response Kits will be carried in all Working Capital Fund 600-class fire vehicles (excluding trailers).

1 Gross Vehicle Weight

2 Each engine and water tender will always have an annually certified weight slip
3 in the vehicle. Weight slips will show individual axle weights and total GVW.
4 Operators of engines and water tenders must ensure that the maximum certified
5 gross vehicle and axle weight ratings are never exceeded, including gear,
6 personnel, and fuel. The National Fire Protection Association (NFPA) 1906
7 standard of 250 pounds per seat position for each person and their personal gear
8 will be used to calculate the loaded weight.

- 9 • **FS** – Refer to FSH 7109.19, chapter 30 for calculation of rough road factor
10 reduction for driving on rough or unsurfaced roads.

11 Speed Limits

12 Posted speed limits will not be exceeded.

13 Lighting

14 Headlights and taillights will be illuminated while the vehicle is in motion.

15 All new orders for fire engine apparatus will include an overhead lighting
16 package in accordance with agency standards. Lighting packages will meet
17 NFPA 1906 standards at the time of manufacture. Engines currently in service
18 may be equipped with overhead lighting packages. A red, white, and amber
19 combination is the accepted color scheme for wildland fire.

20 Emergency Light Use

21 Emergency lighting will be used only during onsite wildland fire operations or
22 to mitigate serious safety hazards. Overhead lighting and other emergency
23 lighting must meet State code requirements and will be illuminated whenever
24 the visibility is reduced to less than 300 feet.

- 25 • **BLM/NPS/FWS/BIA** – See agency chapters or policy for specific
26 guidance.
- 27 • **FS** – See FSM 5120, FSM 5130, and FSH 5109.16 for red lights and sirens
28 policy.

29 Fire Equipment Maintenance and Inspections

30 Apparatus safety and operational inspections will be accomplished either on a
31 post-fire or daily basis. Offices are required to document these inspections.
32 Periodic maintenance (as required by the manufacturer) shall be performed at
33 the intervals recommended and properly documented. All annual inspections
34 will include a pump performance test to ensure the pump/plumbing system is
35 operating at desired specifications (pressure and gallons per minute).

36 Mobile Attack (Pump and Roll)

37 Firefighters must be seated and belted within an enclosed cab or walking
38 alongside the apparatus during mobile attack (pump and roll) operations. Riding,
39 standing, or seated on the exterior of the apparatus is prohibited. Utilization of
40 the NFPA 1906 “on-board pump-and-roll fire-fighting position” if equipped, is
41 not permitted.

1 **Firefighting Engines**

2 **Operational Procedures**

3 All engines will be equipped, operated, and maintained within guidelines
 4 established by the Department of Transportation (DOT) and regional/state/local
 5 operating plans. All personnel assigned to agency fire engines will meet all gear
 6 weight, cube, and manifest requirements specified in the *National Interagency*
 7 *Mobilization Guide*.

8 **Engine Typing**

9 Engine typing and respective standards have been established by the National
 10 Wildfire Coordinating Group (NWCG) and are available at
 11 <https://www.nwcg.gov/publications/pms200>.

Engine Type	Structure		Wildland Engines				
Components	1	2	3	4	5	6	7
Tank Minimum Capacity (gal)	300	300	500	750	400	150	50
Pump Minimum Flow (GPM)	1000	500	150	50	50	50	10
@ Rated Pressure (PSI)	150	150	250	100	100	100	100
Hose 2½"	1200	1000	-	-	-	-	-
Hose 1½"	500	500	1000	300	300	300	-
Hose 1"	-	-	500	300	300	300	200
Ladders (per NFPA 1901)	Yes	Yes	-	-	-	-	-
Master Stream 500 GPM (minimum)	Yes	-	-	-	-	-	-
Pump and Roll	-	-	Yes	Yes	Yes	Yes	Yes
Maximum GVWR (lbs.)	-	-	-	-	26,000	19,500	14,000
Personnel (NWCG minimum)	4	3	3	2	2	2	2

12 • **FS** – See <https://www.fs.usda.gov/managing-land/fire/engines> for
 13 description of Forest Service national engine standards.

14 **Fire Engine Staffing**

15 For type 4, 5, 6, and 7 engines, minimum staffing is two individuals one of
 16 which is engine boss qualified.

- 1 For type 3 engines, minimum staffing is three individuals, including an engine
 2 boss.
- 3 • **BLM** – For BLM engine staffing requirements, see chapter 2.
 - 4 • **NPS** – For NPS engine staffing requirements see chapter 3.

5 Engine Inventories

6 An inventory of supplies and equipment carried on each vehicle is required to
 7 maintain accountability and to obtain replacement items lost or damaged on
 8 incidents. Refer to agency-specific requirements regarding standard inventory
 9 for engines.

- 10 • **BLM** – Refer to <https://doimspp.sharepoint.com/sites/blm-fa/fire-operations/SitePages/NFEP-Policy-Resources.aspx>.
- 12 • **FWS** – Refer to *Fire Management Handbook*, chapter 14.

13 Water Tenders

14 Water Tender Typing

15 Water tender typing and respective standards have been established by NWCG.
 16 <https://www.nwcg.gov/publications/pms200>

Water Tender Type	Support			Tactical	
	<i>S1</i>	<i>S2</i>	<i>S3</i>	<i>T1</i>	<i>T2</i>
Tank Capacity (gal)	4000	2500	1000	2000	1000
Pump Minimum Flow (GPM)	300	200	200	250	250
@Rated Pressure (PSI)	50	50	50	150	150
Maximum Refill Time (mins)	30	20	15	-	-
Pump and Roll	-	-	-	Yes	Yes
Personnel (min)	1	1	1	2	2

17 Water Tender Qualifications and Staffing Standards

- 18 • **Water Tender (Non-Tactical)**
 - 19 ○ **Qualifications:** CDL (tank endorsement)
 - 20 ▪ **BLM** – Refer to the *Federal Wildland Fire Qualifications Supplement*.
 - 22 ○ **Staffing:** A water tender (non-tactical) may be staffed with a crew of one driver/operator when used in a support role as a fire engine refill unit or for dust abatement. These operators do not have to pass the work capacity test (WCT) but are required to take annual refresher training.
 - 27 ▪ **BLM** – A WCF class-669, non-tactical water tender may be staffed with a crew of one driver/operator when it is used in a support role as a fire engine refill unit or for dust abatement. These operators will pass the moderate WCT, take BL-300/RT-301 and annual

1 *refresher training, and possess a CDL with tank endorsement and*
2 *air brake endorsement (if applicable).*

3 • **Water Tender (Tactical)**

4 Tactical use is defined as “direct fire suppression missions such as pumping
5 hose lays, live reel use, running attack, and use of spray bars and monitors
6 to suppress fires.”

7 ○ **Qualifications:**

- 8 ■ *BLM – engine operator (ENOP), CDL (tank endorsement) and*
9 *airbrakes endorsement (if applicable).*
10 ■ *NPS/FWS – engine boss (ENGB), CDL (tank endorsement)*
11 ■ *FS – firefighter, type 1 (FFT1), CDL*
12 ○ **Staffing:** Tactical water tenders will carry a minimum crew of two:
13 ■ *BLM A WCF class-669 tactical water tender shall be staffed with*
14 *minimum crew of one engine operator (ENOP) and one firefighter,*
15 *type 2 (FFT2).*
16 ■ *NPS/FWS – One ENGB and one FFT2.*
17 ■ *FS – One FFT1 and one FFT1/FFT2.*

18 **Dozers/Tractor Plows**

19 **Dozer/Tractor Plow Training and Qualifications**

20 Agency wildland fire dozers/tractor plows will be staffed with personnel that
21 meet the training and experience standards for dozer operator (DZOP) or dozer
22 operator initial attack (DZIA) per the *Federal Wildland Fire Qualifications*
23 *Supplement*. While on fire assignments, all operators and support crew will meet
24 personal protective equipment (PPE) requirements.

25 **Dozer/Tractor Plow Operational Procedures**

- 26 • Agency-owned-and-operated dozer/tractor plows will be equipped with
27 programmable two-way radios, configured to allow the operator to monitor
28 radio traffic.
29 • Agency and contract dozer/tractor plows will have agency-supplied
30 supervision when assigned to any suppression operations.
31 • Contract dozers must be provided with radio communications, either
32 through a qualified heavy equipment boss (HEQB) or an agency-supplied
33 radio. Contract dozer/tractor plows will meet the specifications identified in
34 their agreement/contract.
35 • Operators of dozer/tractor plows and transport equipment will meet DOT
36 certifications and requirements regarding the use and movement of heavy
37 equipment, including driving limitations, CDL requirements, and pilot car
38 use.

39 **All-Terrain Vehicles/Utility-Terrain Vehicles**

40 The operation of all-terrain vehicles (ATV)/utility-terrain vehicles (UTV) can be
41 high risk. The use of ATVs/UTVs should be evaluated to ensure that use is
42 essential to accomplish the mission, rather than for convenience.

- 1 • **BLM** – *BLM personnel will not use ATVs for any wildland fire management*
2 *activity, including preparedness, suppression, prescribed fire, hazardous*
3 *fuels reduction, post-fire rehabilitation, and emergency stabilization and*
4 *restoration, regardless of incident jurisdiction or project/activity location.*
5 *The State directors, assistant state directors and the Director, National*
6 *Operations Center have the authority to approve exceptions to this policy*
7 *on a case-by-case basis. All requests for exceptions must be in writing and*
8 *will include:*
- 9 ○ *A description of how the ATV is essential for the performance of*
10 *official duties;*
 - 11 ○ *Analysis of the alternatives that were considered;*
 - 12 ○ *Justification for an ATV being the only viable alternative; and*
 - 13 ○ *Concurrence by the applicable field manager, district manager, district*
14 *safety manager, and the state/center safety manager.*
- 15 *Cost is not a basis for approval of an exception and no exceptions may be*
16 *made to the existing ban on industrial use of ATVs.*
- 17 • **BIA** – *All BIA programs will cease the procurement of ATVs used for*
18 *wildland fire management activities (including preparedness, suppression,*
19 *prescribed fire, hazardous fuels reduction, post-fire rehabilitation, and*
20 *emergency stabilization and restoration). BIA personnel will not utilize*
21 *ATVs for any wildland fire management activities, regardless of incident*
22 *jurisdiction or project/activity location.*
- 23 • **BIA** – *Programs may continue to procure and utilize other commercially*
24 *available UTVs, provided the vehicle has manufactured-installed seat belts,*
25 *a steering wheel, is a multi-seat or newly available single-seat model, and*
26 *is equipped with a certified rollover protection structure (ROPS) designed*
27 *and installed by the original equipment manufacturer as standard*
28 *equipment.*
- 29 • **BLM/BIA** – *Employees of cooperating agencies/entities may utilize ATVs*
30 *on BLM/BIA incidents if allowed by their individual agency/entity policy.*
- 31 *ATV/UTV operators will meet the training and certification requirements of*
32 *their agency; employees certified by their agency will be considered qualified*
33 *ATV/UTV operators regardless of incident jurisdiction. Common policy*
34 *requirements for wildland fire operations are highlighted below:*
- 35 • *A job hazard analysis (JHA)/risk assessment (RA) must be completed and*
36 *approved by the supervisor prior to vehicle operation.*
 - 37 • *All personnel authorized to operate an ATV/UTV must first complete*
38 *agency-specific or manufacturer-provided training in safe operating*
39 *procedures and appropriate PPE.*
 - 40 ○ **BLM** – *BLM offices may use either UTV training that is commercially*
41 *available from the Recreational Off-Highway Vehicle Association*
42 *(ROHVA) or continue to use the current version (8/2018) of the BLM*
43 *UTV Operator Field Training Range Cards to train their employees*
44 *who use UTVs. If offices choose to use ROHVA's driver course, they*
45 *must continue to train employees on UTV loading/unloading, trailer*

- 1 *use, and winch operations as prescribed in lesson plans eight through*
2 *ten of the BLM UTV range cards prior to employees engaging in these*
3 *activities. This change does not affect the requirement for UTV riders*
4 *to complete the DOI Talent course, "Introduction to Utility Terrain*
5 *Vehicle Operation" as a prerequisite to the field training provided by*
6 *either ROHVA or the BLM range cards.*
- 7 • **Reevaluation/Recertification** – Operators shall be reevaluated every three
8 years. Infrequent users (less than 16 hours of riding a year) shall have a
9 check ride prior to scheduled use of an ATV/UTV.
 - 10 • **Specific authorization for ATV/UTV use is required.** All ATV/UTV
11 operations must hold a valid Motor Vehicle Operator's Identification Card,
12 OF-346, or agency equivalent.
 - 13 ○ **BLM** – *Upon completion of UTV training and operator certification*
14 *requirements, UTV operator (UTVO) will be placed on the employee's*
15 *incident qualification card. Incident Qualifications and Certification System*
16 *(IQCS) certifying officials are responsible for verifying that UTV*
17 *operator qualifications are current, and that the UTVO qualification is*
18 *removed from the incident qualification card if training, certification,*
19 *or currency requirements lapse.*
 - 20 ○ **NPS/FWS** – *Upon completion of agency-specific ATV/UTV training*
21 *and operator certification requirements, All-terrain vehicle operator*
22 *(ATVO) will be placed on the employee's incident qualification card.*
23 *IQCS certifying officials are responsible for verifying that ATV/UTV*
24 *operator qualifications are current, and that the ATVO qualification is*
25 *removed from the incident qualification card if agency-specific*
26 *training, certification, or currency requirements lapse.*
 - 27 ○ **NPS** – *All off-highway vehicle (OHV) operators (including ATV/UTV)*
28 *must hold a valid State motor vehicle operator's permit. Operating*
29 *restrictions (e.g., use of corrective lenses) identified on the operator's*
30 *permit must be adhered to while operating an OHV. NPS ATV*
31 *operators must be qualified at either the basic or advanced level as*
32 *described in Reference Manual-50B (RM-50B) depending on the*
33 *hazard potential of the operation. All ATV operators shall be provided*
34 *refresher training each year in accordance with a JHA and reevaluated*
35 *by an ASI-certified trainer every 3 years. The reevaluation shall be*
36 *documented. RM-50B, appendix B (ATV Operator*
37 *Accountability/Certification Tracking Record) may be used to*
38 *document the reevaluation. Further information on ATV/UTV use is*
39 *found in RM-50B.*
 - 40 ○ **BIA** – *Upon completion of UTV training and operator certification*
41 *requirements, UTV operator (UTVO) will be placed on the employee's*
42 *Incident qualification card. IQCS certifying officials are responsible*
43 *for verifying that UTV operator qualifications are current, and that the*
44 *UTVO qualification is removed from the Incident qualification card if*
45 *training, certification, or currency requirements lapse.*

- 1 • ATVs can only have a single rider—passengers are prohibited even if the
2 ATV is designed for two riders.
- 3 • UTVs passengers are limited to the number of seats installed by the
4 manufacturer. The operator and passenger(s) must use seatbelts while the
5 vehicle is in motion.
- 6 • Operators must use required PPE while loading/unloading ATV/UTV.
- 7 • Cargo loads shall be loaded and secured as to not affect the vehicle’s center
8 of gravity and shall not exceed manufacturer’s recommendations for
9 maximum carrying capacity; and
- 10 • When transporting external fuel containers with a UTV/ATV, a 5 lb., class
11 BC fire extinguisher must be secured to the UTV/ATV.

12 **Required PPE**

13 ***ATV Head Protection for Wildland Fire Operations***

- 14 • ATV helmets must be always worn during ATV operations (on and off the
15 fireline); and
- 16 • ATV helmets must meet Snell SA2010, SA2015, or DOT certification.
 - 17 ○ A ¾-face model meeting Snell SA2010, SA2015 certification is
18 acceptable for use.
 - 19 ○ Use of half “shorty” helmets requires a JHA/RA for fireline use and
20 must include justification for its use. Refer to the National Technology
21 and Development Program (NTDP) formerly known as Missoula
22 Technology and Development Center (MTDC) *Tech Tip* publication, *A
23 Helmet for ATV Operators with Fireline Duties* (0651-2350-MTDC).

24 ***UTV Head Protection for Wildland Fire Operations***

- 25 • Helmets must meet DOT, American National Standards Institute (ANSI)
26 Z90.1; or Snell SA2010, SA2015 certification unless:
 - 27 ○ UTV is used for low speeds and smooth travel surfaces, administrative
28 use (e.g., campgrounds, incident base camps) UTV operators are not
29 required to wear helmets; or
 - 30 ○ UTV is equipped with approved rollover protection system (ROPS)
- 31 • ***BLM*** – *A comprehensive and properly prepared RA of the specific*
32 *conditions demonstrates no more than a medium residual risk level, then a*
33 *helmet meeting NFPA 1977 or ANSI Z 89.1 type 1, class G standards may*
34 *be worn with chin strap secured in place under chin.*
- 35 • ***NPS*** – *Approved helmets are required for UTV operations that are rated*
36 *moderate (amber) or high (red) using the “ORV Risk Assessment Tool”*
37 *included in the NPS Off-Highway Vehicle Policy.*
- 38 • ***FWS*** – *Per 243 FW 6.6 B.1, a hardhat meeting NFPA 1977 or ANSI Z 89.1*
39 *standards may be worn with chin straps secured in place unless the risk*
40 *assessment for the operation dictates wearing a securely fastened*
41 *motorcycle helmet.*
- 42 • ***FS*** – *UTV helmet (for fire use): must meet the policy within the Safety*
43 *Handbook (6709.11), chapter 70, 71.12; Exhibit 01 states “Specialized*
44 *Equipment, such as ATVs, UTVs, Dirt Bikes, Snowmobiles (Department of*

- 1 *Transportation-approved helmet).” Wearing hardhats while driving or*
2 *riding on a UTV is not allowed. Forest Service policy provides no exception*
3 *to the helmet requirement for low speeds, smooth travel surfaces, or*
4 *administrative use. UTV helmet (for fire use) requirements are the same as*
5 *ATV use. Helmets must meet Snell, or DOT ANSI certification. A ¾-face*
6 *model meeting Snell or DOT certification is acceptable for use. Use of half*
7 *“shorty” helmets requires a JHA/RA for fireline use approved by the*
8 *incident commander (IC) or relevant line officer and must include*
9 *justification for its use. Refer to MTDC Tech Tip 5 publication, A Helmet*
10 *for ATV Operators with Fireline Duties (0651-6 2350-MTDC).*
11 • **BIA** – *UTV helmet (for fire use) must be worn. Helmets must meet DOT,*
12 *ANSI Z90.1: or Snell SA2010, SA2015 certification. Hardhats are not*
13 *approved for wildland fire operations (non-administrative use).*

14 **Eye Protection**

- 15 • Eye protection (goggles, face shield, or safety glasses) is not required for a
16 UTV equipped with an original manufacturer windshield that protects the
17 face from branches, flying debris, etc., unless otherwise required by an
18 associated industrial use activity or JHA/RA.

19 **Other Protection**

20 If operating an ATV/UTV on the fireline, the following are required:

- 21 • Leather or leather-/flame-resistant combination gloves. Flame-resistant
22 flight gloves or NFPA-1977-compliant driving gloves can be used by heavy
23 equipment operators, drivers, and fireline supervisors when not using
24 fireline hand tools.
25 • National-Fire-Protection-Association-(NFPA)-1977 compliant, long-
26 sleeved, flame-resistant shirt (yellow recommended).
27 • NFPA-1977-compliant, flame-resistant trousers.
28 • Wildland fire boots.
29 • Appropriate head protection as described above.
30 ○ **FS** – *Shirt, trousers, and gloves used by USFS personnel must meet*
31 *Forest Service specification 5100-91 (shirt), 5100-92 (trousers), 6170-*
32 *5 (gloves), or be NFPA 1977 compliant.*

33 ATV/UTV operator shall carry a personal communication device (e.g., two-way
34 radio, cellular phone, or satellite phone).

35 All other ATV/UTV specific guidance is found in the respective agency’s
36 policy:

- 37 • **BLM** – *Refer to BLM Handbook 1112-1, chapter 17.*
38 • **NPS** – *Refer to RM-50B Occupational Health and Safety, Section 6.1 Off-*
39 *Highway Vehicle Safety at <https://www.nps.gov/policy/RM50Bdoclist.htm>.*
40 • **FWS** – *Refer to 321 FW 1.*

1 Vehicle Cleaning/Invasive Species Prevention

2 Refer to chapter 11 for guidance on minimizing potential transmission of
3 invasive species.

4 Incident Remote Automated Weather Stations

5 Incident remote automated weather stations (IRAWS – NFES 5869) are readily
6 deployable, portable weather stations that may be utilized in unprepared
7 locations to monitor local weather conditions. IRAWS are intended for use on or
8 near the fireline or at other all-hazards incidents and are installed by National
9 Interagency Fire Center (NIFC) technicians and operated as desired by fire
10 behavior analysts (FBAN) and/or incident meteorologists (IMET) to record and
11 distribute real time weather data.

12 National resource IRAWS systems are cached at NIFC and may be ordered
13 through standard equipment resource ordering systems. Following release from
14 an incident, these stations must be returned to the Remote Sensing/Fire Weather
15 Support Unit (RSFWSU) at NIFC for maintenance, recalibration, and
16 redeployment.

17 Aerial Ignition Devices

18 Information on types of aerial ignition devices, operational guidelines, and
19 personnel qualifications may be found in the *NWCG Standards for Aerial*
20 *Ignition* (PMS 501) available at <https://www.nwcg.gov/publications/501>.

21 Ground Ignition Devices and Transporting/Dispensing Fuel

22 For ground ignition devices, follow the *NWCG Standards for Ground Ignition*
23 *Equipment* (PMS 443) for operational guidelines, personnel qualifications, and
24 equipment selection. <https://www.nwcg.gov/publications/443>

- 25 • **BLM** – *A 10 lb., class BC fire extinguisher is required for UTVs equipped*
26 *with a ground ignition device.*

27 For transporting and dispensing fuel, follow *NWCG Standards for Transporting*
28 *Fuel* (PMS 442) found at <https://www.nwcg.gov/publications/442> or agency-
29 specific guidance.

- 30 • **BLM** – *All Drip torches must meet United States Forest Service (USFS)*
31 *specification 5100-614.*
- 32 • **NPS** – *Follow the Forest Service standard for military style jerrican (UN*
33 *3A1) (PMS 442, page 8).*
- 34 • **FS** – *Direction is found in FSH 6709.11.*