

Chapter 14 Firefighting Equipment

3 Introduction

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

6 Policy

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

11 Approved foam concentrate may be used to improve the efficiency of water,
12 except near waterways where accidental spillage or over spray of the chemical
13 could be harmful to the aquatic ecosystem, or other identified resource
14 concerns.

15 Firefighting Engine/Water Tender Common Standards

16 Driving Standard

17 Refer to driving standards in Chapter 7.

- 18 • *BIA – Refer to Chapter 6 for BIA Specific Motor Vehicle Policies. BIA*
19 *and DOI policy requires all personnel who operate a vehicle with a Gross*
20 *Vehicle Weight (GVW) over 26,000 pounds to have a valid CDL.*

21 Engine/Tactical Water Tender Water Reserve

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

25 Chocks

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

30 Fire Extinguisher

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

33 Nonskid Surfaces

34 All surfaces will comply with National Fire Protection Association (NFPA)
35 1906 Standard for Wildland Fire Apparatus requirements.

1 **First Aid Kit**

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

4 **Gross Vehicle Weight (GVW)**

5 Each engine and water tender will have an annually certified weight slip in the
6 vehicle at all times. Weight slip will show individual axle weights and total
7 GVW. Operators of engines and water tenders must ensure that the maximum
8 certified gross vehicle and axle weight ratings are never exceeded, including
9 gear, personnel, and fuel. The NFPA 1906 standard of 250 pounds per seat
10 position for each person and their personal gear will be used to calculate the
11 loaded weight.

- 12 • **FS** – Refer to FSH 7109.19, Chapter 30 for calculation of Rough Road
13 Factor reduction for driving on rough or unsurfaced roads.

14 **Speed Limits**

15 Posted speed limits will not be exceeded.

16 **Lighting**

17 Headlights and taillights shall be illuminated at all times while the vehicle is in
18 motion. All new orders for fire engine apparatus will include an overhead
19 lighting package in accordance with agency standards. Lighting packages will
20 meet NFPA 1906 standards at the time of manufacture. Engines currently in
21 service may be equipped with overhead lighting packages. A red, white, and
22 amber combination is the accepted color scheme for fire.

23 **Emergency Light Use**

24 Emergency lighting will be used only during on site wildland fire operations or
25 to mitigate serious safety hazards. Overhead lighting and other emergency
26 lighting must meet state code requirements, and will be illuminated whenever
27 the visibility is reduced to less than 300 feet.

- 28 • **BLM/NPS** – See agency chapters or policy for specific guidance.
29 • **FWS** – Refer to Service policy 621 FW 1.
30 • **FS** – See FSM 5120, FSM 5130, and FSH 5109.16 for red lights and siren
31 policy.

32 **Fire Equipment Maintenance and Inspections**

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

1 **Mobile Attack (Pump and Roll)**

2 Firefighters must be seated and belted within an enclosed cab or walk alongside
 3 the apparatus during mobile attack (pump and roll) operations. Riding, standing
 4 or seated on the exterior of the apparatus is prohibited. Utilization of the NFPA
 5 1906 “on-board pump-and-roll fire-fighting position” if equipped, is not
 6 permitted.

7 **Firefighting Engines**

8 **Operational Procedures**

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

14 **Engine Typing**

15 Engine typing and respective standards have been established by NWCG
 16 (reference the *Wildland Fire Incident Management Field Guide* (PMS 210),
 17 Chapter 4).

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	-	-	-	-	-
1½"	500	500	1000	300	300	300	-
1"	-	-	500	300	300	300	200
Ladders per NFPA 1901	Yes	Yes	-	-	-	-	-
Master Stream 500 gpm Min.	Yes	-	-	-	-	-	-
Pump and Roll	-	-	Yes	Yes	Yes	Yes	Yes
Maximum GVWR (lbs.)	-	-	-	-	26,000	19,500	14,000
Personnel (NWCG min.)	4	3	3	2	2	2	2

- 1 • **FS** – See <https://www.fs.fed.us/fire/equipment/engine-models/models.html>
 2 for description of Forest Service national engine standards.

3 **Fire Engine Staffing**

- 4 For Type 4, 5, 6, and 7 engines, minimum staffing is two individuals one of
 5 which is Engine Boss qualified.

- 6 For Type 3 engines, minimum staffing is three individuals, including an Engine
 7 Boss.

- 8 • **BLM** – For BLM engine staffing requirements see Chapter 2.

- 9 • **NPS** – For NPS engine staffing requirements see Chapter 3.

10 **Engine Inventories**

- 11 An inventory of supplies and equipment carried on each vehicle is required to
 12 maintain accountability and to obtain replacement items lost or damaged on
 13 incidents. The standard inventory for engines is found in Appendix M.

14 **Water Tenders**

15 **Water Tender Typing**

- 16 Water tender typing and respective standards have been established by NWCG
 17 (reference the *Wildland Fire Incident Management Field Guide* (PMS 210),
 18 Chapter 4).

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
Max. Refill Time (mins)	30	20	15	-	-
Pump and Roll	-	-	-	Yes	Yes
Personnel (min)	1	1	1	2	2

19 **Water Tender Qualifications and Staffing Standards**

20 • **Water Tender (Non-Tactical)**

- 21 ○ **Qualifications:** CDL (tank endorsement)
 22 ▪ **BLM** – Refer to the *Federal Wildland Fire Qualifications*
 23 *Supplement*.
 24 ○ **Staffing:** A water tender (non-tactical) may be staffed with a crew of
 25 one driver/operator when it is used in a support role as a fire engine
 26 refill unit or for dust abatement. These operators do not have to pass
 27 the Work Capacity Test (WCT) but are required to take annual
 28 refresher training.

- 1 • **Water Tender (Tactical)**
2 Tactical use is defined as “direct fire suppression missions such as
3 pumping hoselays, live reel use, running attack, and use of spray bars and
4 monitors to suppress fires.”
- 5 ○ **Qualifications:**
6 ▪ *BLM – ENOP, CDL (tank endorsement)*
7 ▪ *NPS/FWS – ENGB, CDL (tank endorsement)*
8 ▪ *FS – FFT1, CDL*
- 9 ○ **Staffing:** Tactical water tenders will carry a minimum crew of two:
10 ▪ *BLM – One ENOP and one FFT2.*
11 ▪ *BLM – 668 Super Heavy Tactical Tenders will be staffed with*
12 *one engine boss and one engine crewmember.*
13 ▪ *NPS/FWS – one ENGB and one FFT2.*
14 ▪ *FS – One FFT1 and one FFT1/FFT2.*

15 **Dozers/Tractor Plows**

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

17 Agency personnel assigned as dozer/tractor plow operators will meet the
18 training and experience standards for a Firefighter 2 (FFT2). This includes all
19 safety and annual refresher training. While on fire assignments, all operators
20 and support crew will meet PPE requirements including the use of aramid fiber
21 clothing, hard hats, fire shelters, boots, etc.

22 **Dozer/Tractor Plow Physical Fitness Standards**

23 All employee dozer/tractor plow operators will meet requirements stated in the
24 *Federal Wildland Fire Qualifications Supplement.*

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
34 in 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.

1 All-Terrain Vehicles (ATV)/Utility Terrain Vehicles (UTV)

2 The operation of ATV/UTVs can be high risk. The use of ATV/UTVs should
3 be evaluated to ensure that use is essential to accomplish the mission, rather
4 than for convenience.

- 5 • **BLM** – *BLM personnel will not use ATVs for any wildland fire*
6 *management activity including preparedness, suppression, prescribed fire,*
7 *hazardous fuels reduction, post-fire rehabilitation, and emergency*
8 *stabilization and restoration, regardless of incident jurisdiction or*
9 *project/activity location after January 1, 2018.*
- 10 • **BIA** – *Effective immediately, all BIA programs will cease the procurement*
11 *of ATVs used for wildland fire management activities (including*
12 *preparedness, suppression, prescribed fire, hazardous fuels reduction,*
13 *post-fire rehabilitation, and emergency stabilization and restoration). Any*
14 *ATV currently in service may continue to be utilized for non-industrial*
15 *wildland fire management activities/operations until January 1, 2019.*
16 *After this date, BIA personnel will not utilize ATVs for any wildland fire*
17 *management activities, regardless of incident jurisdiction or*
18 *project/activity location.*
- 19 • **BIA** – *Programs may continue to procure and utilize other commercially*
20 *available utility terrain vehicles (UTVs), provided the vehicle has*
21 *manufactured-installed seat belts, a steering wheel, is a multi-seat or*
22 *newly available single-seat model (e.g., Polaris Ace) and is equipped with*
23 *a certified roll-over protection structure (ROPS) designed and installed by*
24 *the original equipment manufacturer as standard equipment.*
- 25 • **BLM** – *Employees of cooperating agencies/entities may utilize ATVs on*
26 *BLM incidents if allowed by their individual agency/entity policy.*

27 Because of the high risk nature, agencies have developed specific operational
28 policy (refer to current agency policy). ATV/UTV operators will meet the
29 training and certification requirements of their agency; employees certified by
30 their agency will be considered qualified ATV/UTV operators regardless of
31 incident jurisdiction. Common policy requirements for wildland fire operations
32 are highlighted below:

- 33 • A JHA/RA must be completed and approved by the supervisor prior to
34 vehicle operation.
- 35 • All personnel authorized to operate an ATV/UTV must first complete
36 agency specific or manufacturer-provided training in safe operating
37 procedures and appropriate PPE.
- 38 • Re-evaluation/Re-certification – Operators shall be re-evaluated every
39 three years. Infrequent users (less than 16 hours of riding a year) shall have
40 a check ride prior to scheduled use of an ATV/UTV.
- 41 • Specific authorization for ATV/UTV use is required – All ATV/UTV
42 operations must hold a valid Motor Vehicle Operator's Identification Card,
43 OF-346 or agency equivalent.

- 1 ○ **BLM** – Upon completion of agency-specific UTV training and
2 operator certification requirements, Utility-Terrain Vehicle Operator
3 (UTVO) will be placed on the employee’s Incident Qualification and
4 Certification (IQCS) Card (Red Card). IQCS Certifying Officials are
5 responsible for verifying that UTV operator qualifications are current,
6 and that the UTVO qualification is removed from the Red Card if
7 agency-specific training, certification, or currency requirements
8 lapse.
- 9 ○ **NPS/FWS/BIA** – Upon completion of agency-specific ATV/UTV
10 training and operator certification requirements, All-Terrain Vehicle
11 Operator (ATVO) will be placed on the employee’s Incident
12 Qualification and Certification (IQCS) Card (Red Card). IQCS
13 Certifying Officials are responsible for verifying that ATV/UTV
14 operator qualifications are current, and that the ATVO qualification is
15 removed from the Red Card if agency-specific training, certification,
16 or currency requirements lapse.
- 17 ○ **NPS** – All Off-Highway Vehicle (OHV) operators (including
18 ATV/UTV) must hold a valid state Motor Vehicle Operator’s Permit.
19 Operating restrictions identified on the operator’s permit must be
20 adhered to while operating an OHV (e.g., use of corrective lenses,
21 etc.). NPS ATV operators must be qualified at either the Basic or
22 Advanced Level as described in RM-50B depending on the hazard
23 potential of the operation. All ATV operators shall be provided
24 refresher training each year in accordance with a JHA and
25 reevaluated by an ASI Certified Trainer every 3 years. The
26 reevaluation shall be documented. RM-50B, Appendix B (ATV
27 Operator Accountability/Certification Tracking Record) may be used
28 to document the reevaluation. Further information on ATV/UTV use is
29 found in RM-50B.
- 30 ● ATVs can only have a single rider—passengers are prohibited even if
31 ATV is designed for two riders.
- 32 ● UTVs passengers are limited to the number of seats installed by
33 manufacturer. The operator and passenger(s) must use seatbelts while the
34 vehicle is in motion.
- 35 ● Operators must use required PPE while loading/unloading ATV/UTV.
- 36 ● Cargo loads shall be loaded and secured as to not affect the vehicle’s
37 center of gravity, and shall not exceed manufacturer’s recommendations
38 for maximum carrying capacity; and
- 39 ● When transporting external fuel containers with a UTV/ATV, a 5 lb. class
40 BC fire extinguisher must be secured to the UTV/ATV.

41 **Required PPE**

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

- 43 ● ATV helmets must be worn at all times during ATV operations (on and off
44 the fireline); and

- 1 • ATV helmets must meet Snell SA2010, SA2015, or DOT certification.
- 2 ○ A ¾ face model meeting Snell SA2010, SA2015 certification is
- 3 acceptable for use.
- 4 ○ Use of half “shorty” helmets requires a JHA/RA for fireline use and
- 5 must include justification for its use. Refer to MTDC Tech Tip
- 6 publication, *A Helmet for ATV Operators with Fireline Duties* (0651-
- 7 2350-MTDC).
- 8 UTV Head Protection for Wildland Fire Operations:
- 9 • Helmets must meet DOT, ANSI Z90.1; or Snell SA2010, SA2015
- 10 certification unless:
- 11 ○ UTV is used for low speeds and smooth travel surfaces, administrative
- 12 use (e.g., campgrounds, incident base camps) UTV operators are not
- 13 required to wear hardhats or helmets; or
- 14 ○ UTV is equipped with approved Rollover Protection System (ROPS),
- 15 and:
- 16 ■ **BLM** – *A comprehensive and properly prepared RA of the*
- 17 *specific conditions demonstrates no more than a medium residual*
- 18 *risk level, then a hard hat meeting NFPA 1977 or ANSI Z 89.1*
- 19 *2009 Type I, Class G standards may be worn with chin straps*
- 20 *secured in place under chin.*
- 21 ■ **NPS** – *Approved helmets are required for UTV operations that*
- 22 *are rated moderate (amber) or high (red) using the “ORV Risk*
- 23 *Assessment Tool” included in the NPS Off-Highway Vehicle*
- 24 *Policy.*
- 25 ■ **FWS** – *Per 243 FW 6.6 B.1, a hardhat meeting NFPA 1977 or*
- 26 *ANSI Z 89.1 standards may be worn with chin straps secured in*
- 27 *place unless the risk assessment for the operation dictates*
- 28 *wearing a securely fastened motorcycle helmet.*
- 29 ■ **FS** – *UTV Helmet (for fire use) – Helmets must have Snell SA*
- 30 *certification. Wearing hardhats while driving or riding on a UTV*
- 31 *is not allowed. Forest Service policy provides no exception to the*
- 32 *helmet requirement for low speeds, smooth travel surfaces, or*
- 33 *administrative use (FSH 6709.11, Chapter 10).*
- 34 Eye protection (goggles, face shield, or safety glasses) based upon JHA/RA:
- 35 • Eye protection is not required for a UTV equipped with an original
- 36 manufacturer windshield that protects the face from branches, flying
- 37 debris, etc., unless otherwise required by an associated industrial use
- 38 activity or JHA/RA.
- 39 If operating ATV/UTV on the fireline, the following are required:
- 40 • Leather or leather/flame resistant combination gloves. Flame resistant
- 41 flight gloves or NFPA 1977 compliant Driving Gloves can be used by

- 1 heavy equipment operators, drivers and fireline supervisors when not using
2 fireline hand tools.
- 3 • National Fire Protection Association (NFPA) 1977 compliant long-sleeved
4 flame resistant shirt (yellow recommended).
 - 5 • NFPA 1977 compliant flame resistant trousers.
 - 6 • Wildland fire boots.
 - 7 • Appropriate head protection as described above.
 - 8 ○ *FS – Shirt, trousers, and gloves used by USFS personnel must meet*
9 *Forest Service specification 5100-91 (shirt), 5100-92 (trousers),*
10 *6170-5 (gloves), or be NFPA 1977 compliant.*

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

13 All other ATV/UTV specific guidance is found in the respective agency's
14 policy:

- 15 • *BLM – Refer to BLM Manual 1112-1, Chapter 17 Off-Highway Vehicles*
16 *at <http://web.blm.gov/internal/wo-500/directives/dir-hdbk/h1112-1.pdf>.*
17 *Refer to Instruction Memorandum No. WO 2017-014, Transporting Utility*
18 *Terrain Vehicles (UTVs) in Pick-up Trucks.*
- 19 • *NPS – Refer to Reference Manual 50B Occupational Health and Safety,*
20 *Section 6.1 Off-Highway Vehicle Safety at*
21 *<https://www.nps.gov/policy/RM50Bdoclist.htm>.*

22 **Vehicle Cleaning/Invasive Species Prevention**

23 Refer to Chapter 11 for guidance on minimizing potential transmission of
24 invasive species.

25 **Incident Remote Automated Weather Stations**

26 Incident Remote Automated Weather Stations (IRAWS – NFES 5869) are
27 readily deployable, portable weather stations that may be utilized in unprepared
28 locations to monitor local weather conditions. IRAWS are intended for use on
29 or near the fireline or at other all-risk incidents, and are installed and operated
30 as desired by Fire Behavior Analysts (FBAN) and/or Incident Meteorologists
31 (IMET) to record and distribute real time weather data.

32 National resource IRAWS systems are cached at the National Interagency Fire
33 Center (NIFC) and may be ordered through standard equipment resource
34 ordering systems. Following release from an incident, these stations must be
35 returned to the Remote Sensing/Fire Weather Support Unit (RSFWSU) at
36 NIFC for maintenance, recalibration, and redeployment.

1 Aerial Ignition Devices

2 Information on types of aerial ignition devices, operational guidelines, and
3 personnel qualifications may be found in the *Interagency Aerial Ignition Guide*
4 (PMS 501) available at <https://www.nwcg.gov/publications/501>.

5 Ground Ignition Devices and Transporting/Dispensing Fuel

6 For ground ignition devices, follow the *Interagency Ground Ignition Guide*
7 (PMS 443) for operational guidelines, personnel qualifications, and equipment
8 selection. <https://www.nwcg.gov/publications/443>

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

11 For transporting and dispensing fuel, follow the *Interagency Transportation*
12 *Guide for Gasoline, Mixed Gas, Drip-Torch Fuel, and Diesel* (PMS 442) found
13 at <https://www.nwcg.gov/publications/442> or agency-specific guidance.

- 14 • **NPS** – *Follow the Forest Service standard for military style jerrican (UN*
15 *3A1) (Page 8, PMS 442).*
16 • **FS** – *Direction is found in FSH 6709.11.*