

1 **Chapter 14**
2 **Firefighting Equipment**

3
4 **Introduction**

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

8
9 **Policy**

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

15
16 Approved foam concentrate may be used to improve the efficiency of water,
17 except near waterways where accidental spillage or over spray of the chemical
18 could be harmful to the aquatic ecosystem, or other identified resource concerns.

19
20 **Firefighting Engine/Water Tender Common Standards**

21
22 **Driving Standard**

23 Refer to driving standards in Chapter 07.

24
25 **Engine/Tactical Water Tender Water Reserve**

26 Engine/Tactical Water Tender Operators will maintain at least 10 percent of the
27 pumpable capacity of the water tank for emergency engine protection and
28 drafting.

29
30 **Chocks**

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

35
36 **Fire Extinguisher**

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

39
40 **Nonskid Surfaces**

41 All surfaces will comply with National Fire Protection Association (NFPA)
42 1906 Standard for Wildland Fire Apparatus requirements.

43
44
45

1 **First Aid Kit**

2 Each engine/water tender shall carry, in a clearly marked compartment, a fully
3 equipped 10-person first aid kit.

4

5 **Gross Vehicle Weight (GVW)**

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

- 13 • *FS - Refer to FSH 7109.19, Chapter 30 for calculation of Rough Road*
14 *Factor reduction for driving on rough or unsurfaced roads.*
15 • *NPS - A copy of the annual certified weight slip must be sent to the Fire*
16 *Equipment and Facilities Specialist at the FMPC in Boise prior to the*
17 *vehicle being put into service each season.*

18

19 **Speed Limits**

20 Posted speed limits will not be exceeded.

21

22 **Lighting**

23 Headlights and taillights shall be illuminated at all times while the vehicle is in
24 motion. All new orders for fire engine apparatus will include an overhead
25 lighting package in accordance with agency standards. Lighting packages will
26 meet NFPA 1906 standards at the time of manufacture. Engines currently in
27 service may be equipped with overhead lighting packages. A red, white, and
28 amber combination is the accepted color scheme for fire. Lighting packages
29 containing blue lights are reserved for law enforcement and are not allowed on
30 fire vehicles.

31

32 **Emergency Light Use**

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

- 37 • *DOI- See agency chapters or policy for specific guidance.*
38 • *FS- See FSM 5120 and 5130 for red lights and siren policy.*

39

40 **Fire Engine Maintenance Procedure and Record**

41 Apparatus safety and operational inspections will be accomplished either on a
42 post-fire or daily basis. Offices are required to document these inspections.
43 Periodic maintenance (as required by the manufacturer) shall be performed at
44 the intervals recommended and properly documented. All annual inspections

1 will include a pump performance test to ensure the pump/plumbing system is
 2 operating at desired specifications (pressure and gallons per minute).

3

4 **Firefighting Engines**

5

6 **Operational Procedures**

7 All engines will be equipped, operated, and maintained within guidelines
 8 established by the Department of Transportation (DOT), regional/state/local
 9 operating plans, and procedures outlined in *BLM Manual H-9216, Fire*
 10 *Equipment and Supply Management*, or agency equivalent. All personnel
 11 assigned to agency fire engines will meet all gear weight, cube, and manifest
 12 requirements specified in the *National Mobilization Guide*.

13

14 **Engine Typing**

15 Engine typing and respective standards have been established by NWCG.

16

Components	Engine Type						
	Structure Engines		Wildland Engines				
	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 2 1/2"	1200	1000	-	-	-	-	-
1 1/2"	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

17 • **FS** - See <http://www.fs.fed.us/fire/equipment/engine-models/models.html> for
 18 description of Forest Service national engine standards.

19

20

1 **Fire Engine Staffing**

2 For Type 4,5,6, and 7 engines, minimum staffing is two individuals, including
3 an Engine Boss.

4

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

- 7 • **BLM** - For BLM engine staffing requirements, see Chapter 2.
- 8 • **FWS** - Minimum staffing for Type 6 and 7 engines (on Refuge lands) is one
9 ENOP and one FFT2. A minimum of one ICT5 must be available on the
10 engine crew.
- 11 • **NPS** - For NPS engine staffing requirements see Chapter 3.
- 12 • **FS** - A Single Resource Boss may supervise a Type 6 or 7 engine.

13

14 **Engine Inventories**

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

18

19 **Water Tenders**

20

21 **Water Tender Typing**

22 Water tender typing and respective standards have been established by NWCG.

23

Requirements	Water Tender Type				
	Support			Tactical	
	S1	S2	S3	T1	T2
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

24

25

26

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28

1 **Water Tender Staffing Standards**

2 • **Water Tender (Non-Tactical)**

- 3 ○ **Qualifications:** CDL (tank endorsement).
- 4 ○ **Staffing:** A water tender (non-tactical) may be staffed with a crew of
- 5 one driver/operator when it is used in a support role as a fire engine
- 6 refill unit or for dust abatement. These operators do not have to pass
- 7 the Work Capacity Test (WCT) but are required to take annual
- 8 refresher training.

9 • **Water Tender (Tactical)**

10 Tactical use is defined as “direct fire suppression missions such as pumping
11 hoselays, live reel use, running attack, and use of spray bars and monitors to
12 suppress fires”.

13 ○ **Qualifications:**

14 ■ **BLM/FWS-** *ENOP, CDL (tank endorsement)*

15 ■ **FS-** *FFT1, CDL*

16 ○ **Staffing:** Tactical water tenders will carry a minimum crew of two:

17 ■ **BLM/FWS-** *One ENOP and One FFT2*

18 ■ **FS-** *One FFT1 and One FFT1/FFT2 firefighter*

19

20 **Dozers/Tractor Plows**

21

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

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

28

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

30 • **BLM/NPS** - *All employee dozer/tractor plow operators will meet the WCT*
31 *requirements at the Moderate level before accepting fire assignments.*

32 • **FWS** - *See the Fire Management Handbook*

33 • **FS** - *FS dozer operators refer to FSM 5134.32.*

34

35 **Dozer/Tractor Plow Operational Procedures**

36 • Agency owned and operated dozer/tractor plows will be equipped with
37 programmable two-way radios, configured to allow the operator to monitor
38 radio traffic.

39 • Agency and contract dozer/tractor plows will have agency supplied
40 supervision when assigned to any suppression operations.

41 • Contract dozers must be provided with radio communications, either
42 through a qualified Heavy Equipment Boss (HEQB) or an agency-supplied
43 radio. Contract dozer/tractor plows will meet the specifications identified in
44 their agreement/contract.

- 1 • Operators of dozer/tractor plows and transport equipment will meet DOT
2 certifications and requirements regarding the use and movement of heavy
3 equipment, including driving limitations, CDL requirements, and pilot car
4 use.

6 **All Terrain Vehicles (ATV)/Utility-Terrain Vehicles (UTV)**

7
8 The operation of ATV/UTVs can be high risk. The use of ATV/UTVs should
9 be evaluated to ensure that use is essential to accomplish the mission, rather than
10 for convenience.

- 11 • **BLM-** *After October 1, 2013, all industrial use OHV operations in BLM fire*
12 *operations will be conducted exclusively on UTVs. No ATVs will be used*
13 *for industrial use OHV operations.*

14 Because of the high risk nature, agencies have developed specific operational
15 policy (refer to current agency policy). Common policy requirements for
16 wildland fire operations are highlighted below:

- 17 • A JHA/RA must be completed and approved by the supervisor prior to
18 vehicle operation;
- 19 • All personnel authorized to operate an ATV/UTV must first complete
20 agency specific or manufacturer-provided training in safe operating
21 procedures and appropriate PPE;
- 22 • Re-evaluation/Re-certification - Operators shall be re-evaluated every three
23 years. Infrequent users (less than 16 hours of riding a year) shall have a
24 check ride prior to scheduled use of an ATV/UTV;
- 25 • Specific authorization for ATV/UTV use is required -- all ATV/UTV
26 operations must hold a valid Motor Vehicle Operator's Identification Card,
27 OF-346 or agency equivalent;
- 28 ○ **DOI-** *Upon completion of agency-specific ATV/UTV training and*
29 *operator certification requirements, All-Terrain Vehicle Operator*
30 *(ATVO) will be placed on the employee's Incident Qualification and*
31 *Certification (IQCS) Card (Red Card). IQCS Certifying Officials are*
32 *responsible for verifying that ATV/UTV operator qualifications are*
33 *current, and that the ATVO qualification is removed from the Red Card*
34 *if agency-specific training, certification, or currency requirements*
35 *lapse.*
- 36 ○ **NPS-** *All Off-Highway Vehicle (OHV) operators (including ATV/UTV)*
37 *must hold a valid state Motor Vehicle Operator's Permit. Operating*
38 *restrictions identified on the operator's permit must be adhered to*
39 *while operating an OHV (e.g., use of corrective lenses, etc.). NPS ATV*
40 *operators must be qualified at either the Basic or Advanced Level as*
41 *described in RM-50B depending on the hazard potential of the*
42 *operation. All ATV operators shall be provided refresher training each*
43 *year in accordance with a JHA and reevaluated by an ASI Certified*
44 *Trainer every 3 years. The reevaluation shall be documented. RM-*

- 1 50B, Appendix B (ATV Operator Accountability/Certification Tracking
2 Record) may be used to document the reevaluation. Further
3 information on ATV/UTV use is found in RM-50B.
- 4 ● ATVs can only have a single rider – passengers are prohibited even if ATV
5 is designed for two riders;
 - 6 ● UTVs passengers are limited to the number of seats installed by
7 manufacturer. The operator and passenger(s) must use seatbelts while the
8 vehicle is in motion;
 - 9 ● Operators must use required PPE while loading/unloading ATV/UTV;
 - 10 ● Cargo loads shall be loaded and secured as to not affect the vehicle’s center
11 of gravity, and shall not exceed manufacturer’s recommendations for
12 maximum carrying capacity; and
 - 13 ● When transporting external fuel containers with a UTV/ATV, a 5 lb class
14 BC fire extinguisher must be secured to the UTV/ATV.

15
16 **Required PPE includes:**

17 **ATV Head Protection for Wildland Fire Operations:**

- 18 ● ATV Helmets must be worn at all times during ATV operations (on and off
19 the fireline); and
- 20 ● ATV Helmets must meet Snell SA2005, SA2010, or DOT certification.
 - 21 ○ A ¾ face model meeting Snell SA2005 or SA2010 certification is
22 acceptable for use.
 - 23 ○ Use of half “shorty” helmets requires a JHA/RA for fireline use and
24 must include justification for its use. Refer to MTDC Tech Tip
25 publication, *A Helmet for ATV Operators with Fireline Duties* (0651-
26 2350-MTDC).

27
28 **UTV Head Protection for Wildland Fire Operations:**

- 29 ● Helmets must meet DOT, ANSI Z90.1; or Snell SA2005 or SA2010 unless:
 - 30 ○ UTV is used for low speeds and smooth travel surfaces, administrative
31 use (e.g., campgrounds, incident base camps) UTV operators are not
32 required to wear hardhats or helmets; or
 - 33 ■ **FWS**- Refer to 243 FW 6.
 - 34 ○ UTV is equipped with approved Rollover Protection System (ROPS),
35 and:
 - 36 ■ **BLM** – A comprehensive and properly prepared RA of the specific
37 conditions demonstrates no more than a medium residual risk
38 level, then a hard hat meeting NFPA 1977 or ANSI Z 89.1
39 standards may be worn with chin straps secured in place under
40 chin.
 - 41 ■ **NPS** - Approved helmets are required for UTV operations that are
42 rated moderate (amber) or high (red) using the “ORV Risk
43 Assessment Tool” included in the NPS Off-Highway Vehicle
44 Policy.

- 1 ▪ **FWS-** *A hardhat meeting NFPA 1977 or ANSI Z 89.1 standards may*
- 2 *be worn with chin straps secured in place.*
- 3 ▪ **FS-** *UTV Helmet (for fire use) – Helmets must have Snell SA*
- 4 *certification. Wearing hardhats while driving or riding on a UTV*
- 5 *is not allowed. Forest Service policy provides no exception to the*
- 6 *helmet requirement for low speeds, smooth travel surfaces, or*
- 7 *administrative use (FSH 6709.11, Chapter 10).*
- 8

9 Eye protection (goggles, face shield, or safety glasses) based upon JHA/RA.

- 10 ○ Eye protection is not required for a UTV equipped with an original
- 11 manufacturer windshield that protects the face from branches, flying
- 12 debris, etc., unless otherwise required by an associated industrial use
- 13 activity or JHA/RA.
- 14

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

- 16 ○ Leather or leather/flame resistant combination gloves. Flight gloves
- 17 are not approved for fireline use;
- 18 ○ Yellow flame resistant shirt;
- 19 ○ Flame resistant trousers;
- 20 ○ Wildland fire boots; and
- 21 ○ Appropriate head protection as described above
- 22 ▪ **FS-** *Shirt, trousers, and gloves used by USFS personnel must meet*
- 23 *Forest Service specification 5100-91 (shirt), 5100-92 (trousers),*
- 24 *and 6170-5 (gloves) or be certified to the National Fire Protection*
- 25 *Association (NFPA) 1977, Standard on Protective Clothing and*
- 26 *Equipment for Wildland Fire Fighting.*
- 27

28 ATV/UTV operator shall carry a personal communication device (e.g. two-way

29 radio, cellular phone, or satellite phone).

30 All other ATV/UTV specific guidance is found in the respective agency's

31 policy:

- 32 ○ **BLM** - *Refer to BLM Manual 1112-1, Chapter 27 Off-Highway*
- 33 *Vehicles.*[http://web.blm.gov/portal/employeeresources/allemployees/saf](http://web.blm.gov/portal/employeeresources/allemployees/safety/policy.php)
- 34 *ety/policy.php*
- 35 ○ **FWS** - *Refer to 243 FW 6.*
- 36 ○ **NPS** - *Refer to Reference Manual 50B Occupational Health and Safety,*
- 37 *Section 6.1 Off-Highway Vehicle Safety*
- 38 <http://www.nps.gov/policy/RM50Bdoclist.htm>
- 39

40 **Vehicle Cleaning/Noxious Weed Prevention**

41

42 Refer to Chapter 11 for guidance on minimizing potential transmission of

43 invasive species.

44

45

1 Incident Remote Automated Weather Stations

2

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

9

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

15

16 Aerial Ignition Devices

17

18 Information on types of aerial ignition devices, operational guidelines, and
19 personnel qualifications may be found in the *Interagency Aerial Ignition Guide*.

20

21 Ground Ignition Devices and Transporting/Dispensing Fuel

22

23 For ground ignition devices: Follow the *Interagency Ground Ignition Guide*
24 (PMS 443) for operational guidelines, personnel qualifications, and equipment
25 selection.

26

27 For transporting and dispensing fuel: Follow the *Interagency Transportation*
28 *Guide for Gasoline, Mixed Gas, Drip-Torch Fuel, and Diesel* (PMS 442). These
29 guides are posted at <http://www.nwccg.gov/pms/pubs/pubs.htm>.

- 30 • **FS** - direction is found in *FSH 5109.32a* and *6709.11*.