

## Chapter 14 Firefighting Equipment

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### 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.

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

### Driving Standard

Refer to driving standards in Chapter 07.

### Firefighting Engines

#### Operational Procedures

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

#### Fire Engine Staffing

An ENGB will be with every engine, and the minimum staffing is two individuals for Type 6 and Type 7 engines.

For Type 3, 4, and 5 engines, minimum staffing is three individuals, including an Engine Boss.

- **BLM - Fire Engine Staffing**
  - For BLM engine staffing requirements see Chapter 2.
- **FWS - Fire Engine Staffing**
  - Minimum staffing for Type 4, 5, 6 and 7 engines (on Refuge lands) is one ENOP and one FFT2.
- **NPS - Fire Engine Staffing**
  - For NPS engine staffing requirements see Chapter 3.
- **FS - A Single Resource Boss may supervise a type 6 or 7 engine.**

**1 Engine Typing**

2 Engine Typing and respective standards are identified in the *NWCG Fireline Handbook, 410-1*.

4

**5 Engine Water Reserve**

6 Engine Operators will maintain at least 10 percent of the pumpable capacity of the water tank for emergency engine protection and drafting.

8

**9 Chocks**

10 At least one chock will be carried on each engine and will be properly utilized whenever the engine is parked or left unattended. This includes engine operation in a stationary mode without a driver "in place."

13

**14 Fire Extinguisher**

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

17

**18 Nonskid Surfaces**

19 All surfaces will comply with National Fire Protection Association (*NFPA 1906 Standards for Wildland Fire Apparatus (6.4.3.)*) guidelines.

21

**22 First Aid Kit**

23 Each engine shall carry, in a clearly marked compartment, a fully equipped 10-person first aid kit.

25

**26 Gross Vehicle Weight (GVW)**

27 Each engine will have an annually certified weight slip in the vehicle at all times. Operators of engines and water tenders must ensure that the maximum certified GVW is never exceeded, including gear, personnel and fuel. If the proper number of personnel are not available during the weighing. The NFPA 1906 standard of 250 pounds for each person and their personal gear may be used to calculate the loaded weight.

- 33 • *FS - Supervisors must ensure that the maximum allowable weight of the vehicle is not exceeded. For commercially designed highway vehicles used in off-highway applications, the Cargo Load (CL) must not exceed 90% of the difference between the Gross Vehicle Weight Rating (GVWR) and the vehicle's Curb Weight (CW). In numerical form:  $Max\ CL = .90 (GVWR - CW) - DP$  The curb weight (CW) is defined as the actual weight of a vehicle including all permanently attached items and a full tank of fuel. It does not include the cargo (water, tools, supplies, gear, etc), the driver, or passengers. DP is the driver and passengers riding in the vehicle. GVWR is the maximum weight at which the vehicle is certified to operate. The maximum allowable vehicle operating weight is therefore the curb weight plus the allowable cargo load. The Gross Axle Weight Ratings (GAWR) shall not be exceeded under any circumstances.*

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1 **Speed Limits**

2 Posted speed limits will not be exceeded.

3

4 **Lighting**

5 All new orders for fire engine apparatus will include an overhead lighting  
6 package in accordance with agency standards. Lighting packages will meet  
7 NFPA 1906 standards. Engines currently in service may be equipped with  
8 overhead lighting packages. Lighting packages containing blue lights are not  
9 allowed. Blue lights have been reserved for law enforcement and must not be  
10 used on fire vehicles. A red, white, and amber combination is the accepted color  
11 scheme for fire.

12

13 **Emergency Light Use**

14 Headlights and taillights will be illuminated at all times while the vehicle is in  
15 motion. Emergency lighting will be used only during on site wildland fire  
16 operations or to mitigate serious safety hazards. Overhead lighting and other  
17 emergency lighting must meet state code requirements, and will be illuminated  
18 whenever the visibility is reduced to less than 300 feet. Blue lights are not  
19 acceptable for wildland fire operations.

- 20 • *BLM - Emergency lighting may be used during a response to an incident or*  
21 *to mitigate serious safety hazards. If emergency lighting is to be used it*  
22 *must be approved by State Director and meet all state and local emergency*  
23 *services training and certification requirements. Overhead lighting and*  
24 *other emergency lighting must meet state code requirements.*  
25 • *FS - See FSM 5120 and 5135 for red lights and siren policy.*

26

27 **Light Use Visibility**

28 Headlights and taillights shall remain illuminated at all times while the vehicle is  
29 in operation. Overhead lighting (or other appropriate emergency lights) shall be  
30 illuminated whenever visibility is reduced to less than 300 feet.

31

32 **Fuel Use, Storage and Transportation**

33 Guidance and direction for the use, storage, and transportation of fuel can be  
34 found in the interagency interim policy *Interagency Transportation Guide for*  
35 *Gasoline, Mixed Gas, Drip Torch Fuel, and Diesel* at:  
36 <http://www.fs.fed.us/t-d/fueltran/> (Use t-d as user and password logins)

37

38 **Fire Engine Maintenance Procedure and Record**

39 Apparatus safety and operational inspections will be accomplished either on a  
40 post-fire or daily basis. Offices are required to document these inspections.  
41 Periodic maintenance (as required by the manufacturer) shall be performed at  
42 the intervals recommended and properly documented. All annual inspections  
43 will include a pump gallons per minute (GPM) test to ensure the pump/plumbing  
44 system is operating at desired specifications.

45

**1 Engine Inventories**

2 An inventory of supplies and equipment carried on each vehicle is required to  
3 maintain accountability and to obtain replacement items lost or damaged on  
4 incidents. The standard inventory for engines is found in Appendix R

**6 Water Tenders****8 Water Tender Staffing Standards****10 Water Tender Non-Tactical**

- 11 • **Qualifications:** CDL (tank endorsement).
- 12 • **Staffing:** A water tender (Support) may be staffed with a crew of one  
13 driver/operator when it is used in a support role as a fire engine refill unit or  
14 for dust abatement. These operators do not have to pass the Work Capacity  
15 Test (WCT) but are required to take annual refresher training.

**17 Water Tender Tactical**

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

- 21 • **Qualifications:** ENOP, CDL (tank endorsement)
- 22 • **Staffing:** Tactical water tenders will carry a minimum crew of two:
  - 23 • One ENOP
  - 24 • One Engine Module Member

**26 Dozers/Tractor Plows****28 Dozer/Tractor Plow Training and Qualifications**

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

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

- 36 • **BLM** - All employee dozer/tractor plow operators will meet the WCT  
37 requirements at the Moderate level before accepting fire assignments.
- 38 • **FWS** - See the Fire Management Handbook
- 39 • **FS** - FS dozer operators refer to 5134.32.

**41 Dozer/Tractor Plow Operational Procedures**

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

- 1 • Agency dozer/tractor plows with non-red carded operators and all contract  
2 dozer/tractor plows will have agency supplied supervision when assigned to  
3 any suppression operations.
- 4 • Contract or offer-for-hire dozers must also be provided with radio  
5 communications, either through a qualified dozer/tractor plow boss or an  
6 agency-supplied radio. Contract dozer/tractor plows will meet the  
7 specifications identified in their agreement/contract.
- 8 • Operators of dozer/tractor plows and transport equipment will meet DOT  
9 certifications and requirements regarding the use and movement of heavy  
10 equipment, including driving limitations, CDL requirements, and pilot car  
11 use.

12

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

14 The operation of ATV/UTV can be high risk and their use needs to be evaluated  
15 to determine if it is essential to accomplish the mission and not as a matter of  
16 convenience.

17

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

- 21 • Specific authorization for ATV/UTV use is required.
- 22 • All personnel authorized to operate an ATV/UTV must first complete  
23 agency specific or manufacturers training in safe operating procedures and  
24 appropriate PPE.
- 25 • Re-evaluation/Re-certification - Operators shall be re-evaluated every three  
26 years. Infrequent users (less than 16 hours of riding a year) shall have a  
27 check ride prior to scheduled use of an ATV/UTV.

28

**29 Required PPE includes:**

- 30 • ATV Helmet - Helmets meeting DOT, ANSI-90, or SNELL M-95 are  
31 required.
- 32 • Helmets worn by wildland firefighters on fire line duty must be lined by  
33 Nomex©/Aramid type fire-resistant material.
- 34 • Use of half "shorty" helmets require a JHA/RA for fireline use and must  
35 include justification for its use. Refer to MTDC Tech Tip publication, A  
36 Helmet for ATV Operators with Fireline Duties (0651-2350-MTDC).
  - 37 • *NPS - Helmets worn by wildland firefighters on fire line duty must be*  
38 *lined by Nomex©/Aramid type fire-resistant material. Approved flight*  
39 *helmets such as SPH-4, SPH-5, or other comparable flight helmets are*  
40 *also authorized until September 30, 2009.*
- 41 • UTV Head Protection - Helmets meeting DOT, ANSI-90, or SNELL M-95  
42 approved are required unless:

- 1 • Cab/brush cage is permanently installed on the vehicle then a hard hat
- 2 meeting NFPA 1977 and ANSI Z 89.1 standards may be worn with
- 3 chin straps secured in place under chin.
- 4 • **BLM** - UTV is equipped with Roll over protection system (ROPS) and is
- 5 operated on moderate terrain at moderate speeds then a hard hat meeting
- 6 NFPA 1977 and ANSI Z 89.1 standards may be worn with chin straps
- 7 secured in place under chin.
- 8 • **BLM** - Administrative use (low speeds on smooth travel surfaces), e.g.
- 9 campgrounds, base camps; UTV operators are not required to wear hard
- 10 hats or a helmet.
- 11 • **NPS** - Approved helmets are required for UTV operations that are rated
- 12 moderate (amber) or high (red) using the "ORV Risk Assessment Tool"
- 13 included in the NPS Off-Highway Vehicle Policy
- 14 • eye protection (goggles, face shield, or safety glasses) based upon JHA/RA.
- 15 • leather gloves
- 16 • yellow aramid shirt
- 17 • aramid trousers
- 18 • wildland fire boots
- 19 • ATV/UTV operator shall carry a personal communication device (e.g. two-
- 20 way radio, cellular phone, or satellite phone).
- 21 • ATV - do not carry passengers on ATVs.
- 22 • UTV - carry no more passengers in a UTV than the number of seats
- 23 installed by the manufacturer. The operator and each passenger must have
- 24 their own seatbelt and it must be fastened at all times when the vehicle is in
- 25 motion.
- 26 • Loads shall be mounted and secured as to not affect the vehicle's center of
- 27 gravity. See agency specific policy for hauling liquid cargo.
- 28 • Load weights shall not exceed manufacturer's recommendations.
- 29 • ATV/UTV loading and transport - see agency specific policy.
- 30 • A JHA/RA must be completed and approved by the supervisor prior to
- 31 vehicle operation.
- 32 • **BLM** - Refer to *BLM Manual 1112-1, Chapter 27 Off-Highway Vehicles.*
- 33 *<http://web.blm.gov/internal/wo-700/wo740/policy.html>*
- 34 • **FS** - Refer to *Refer to ID 6709.11-2008-2*
- 35 • **FWS** - Refer to *Service Manual 243 FW 6 Off Road Utility Vehicle Safety.*
- 36 • **NPS**- Refer to *Reference Manual 50B Occupational Health and Safety, draft*
- 37 *Section 6.1 Off-Highway Vehicle Safety*
- 38 *[http://inside.nps.gov/waso/custommenu.cfm?lv=2&prg=46&id=5898.](http://inside.nps.gov/waso/custommenu.cfm?lv=2&prg=46&id=5898)*
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#### 40 **Vehicle Cleaning/Noxious Weed Prevention**

41 To reduce the transport, introduction, and establishment of noxious weeds or  
42 other biological contaminants on the landscape due to fire suppression activities,  
43 fire suppression and support vehicles should be cleaned at a designated area

1 prior to arriving and leaving the incident. Onsite fire equipment should be used  
2 to thoroughly clean the undercarriage, fender wells, tires, radiator, and exterior  
3 of the vehicle. The cleaning area should also be clearly marked to identify the  
4 area for post fire control treatments, as needed.

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#### 6 **Fire Remote Automated Weather Stations**

7 Fire Remote Automated Weather Stations (FRAWS) are portable weather  
8 stations that pack up into a single container and may be utilized in any location  
9 to monitor local weather conditions. FRAWS are intended for use on or near the  
10 fireline and are rapidly relocated to points desired by Fire Behavior Analyst  
11 (FBAN) for real time weather data.

12

13 National resource FRAWS systems are cached at the National Interagency Fire  
14 Center (NIFC) and may be ordered through standard equipment resource  
15 ordering systems. Maintenance and recalibration of these stations must be  
16 coordinated with the NIFC Remote Sensing/Fire Weather Support Unit  
17 (RSFWSU).

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#### 19 **Fuel Use, Storage and Transportation**

20 Guidance and direction for the use, storage, and transportation of fuel can be  
21 found in the interagency interim policy "Interagency Fuel Transportation Guide"  
22 at: <http://www.fs.fed.us/t-d/fueltran/>. (Use t-d as user and password logins)

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#### 24 **Aerial Ignition Devices**

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

27

#### 28 **Ground Ignition Devices**

- 29 • *BLM - Guidance and direction for use and procurement of approved  
30 ground ignition equipment and the transportation and dispensing of drip  
31 torch fuel can be found in the Drip Torch Fuel Transportation and  
32 Dispensing Direction.*
- 33 • *NPS - Agency direction may be found in the 04/04/03 Memorandum Y14  
34 (9560) Aerial and Ground Ignition Equipment.*
- 35 • *FWS - specific information on ignition devices may be found in the January  
36 28, 2003 Memorandum: "Direction for Use and Purchase of Aerial and  
37 Ground Ignition Equipment."*
- 38 • *FS - direction is found in FSH 5109.32a and 6709.11.*