

## 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 ~~4, 5, 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. A minimum of one ICT5 must be available on the engine crew.
- **NPS - Fire Engine Staffing**
  - For NPS engine staffing requirements see Chapter 3.

- 1 • *FS - A Single Resource Boss may supervise a type 6 or 7 engine.*

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#### 4 **Engine Typing**

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

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

#### 10 **Driving Standard**

11 *Refer to driving standards in Chapter 07.*

#### 13 **Engine Water Reserve**

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

#### 17 **Chocks**

18 At least one ~~choek~~set of wheel chocks 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.”

#### 22 **Fire Extinguisher**

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

#### 26 **Nonskid Surfaces**

27 All surfaces will comply with National Fire Protection Association (NFPA) 1906 ~~Standards~~Standard for Wildland Fire Apparatus (6.4.3.) ~~guidelines~~requirements.

#### 31 **First Aid Kit**

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

#### 35 **Gross Vehicle Weight (GVW)**

36 Each engine will have an annually certified weight slip in the vehicle at all times. Weight slip will show individual axle weights and total GVW. 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~~will be used to calculate the loaded weight.

- ~~FS - Supervisors must ensure that the maximum allowable weight of the vehicle is not exceeded. For commercially designed highway vehicles used~~

1 ~~in off-highway applications, the Cargo Load (CL) must not exceed 90% of~~  
2 ~~the difference between the Gross Vehicle Weight Rating (GVWR) and the~~  
3 ~~vehicle's Curb Weight (CW). In numerical form: Max CL = .90 (GVWR -~~  
4 ~~CW) - DP. The curb weight (CW) is defined as the actual weight of a~~  
5 ~~vehicle including all permanently attached items and a full tank of fuel. It~~  
6 ~~does not include the cargo (water, tools, supplies, gear, etc), the driver, or~~  
7 ~~passengers. DP is the driver and passengers riding in the vehicle. GVWR~~  
8 ~~is the maximum weight at which the vehicle is certified to operate. The~~  
9 ~~maximum allowable vehicle operating weight is therefore the curb weight~~  
10 ~~plus the allowable cargo load. The Gross Axle Weight Ratings (GAWR)~~  
11 ~~shall not be exceeded under any circumstances.~~

- 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 ● NPS - A copy of the annual certified weight slip must be sent to the Fire  
15 Equipment and Facilities Specialist at the FMPC in Boise prior to the  
16 vehicle being put into service each season.

### 19 Speed Limits

20 Posted speed limits will not be exceeded.

### 22 Lighting

23 Headlights and taillights shall remain illuminated at all times while the vehicle is  
24 in 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- (6.8, 2006 edition). Engines currently in service  
27 may be equipped with overhead lighting packages. A red, white, and amber  
28 combination is the accepted color scheme for fire. Lighting packages containing  
29 blue lights are ~~not allowed.~~ ~~Blue lights have been~~ reserved for law enforcement  
30 and ~~must~~ are not be used allowed on fire vehicles. ~~A red, white, and amber~~  
31 ~~combination is the accepted color scheme for fire.~~

### 33 Emergency Light Use

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

- 40 ● *BLM - Emergency lighting may be used during a response to an incident or*  
41 *to mitigate serious safety hazards. If emergency lighting is to be used it*  
42 *must be approved by State Director and meet all state and local emergency*  
43 *services training and certification requirements. Overhead lighting and*  
44 *other emergency lighting must meet state code requirements.*

- 1 • *FS* - See *FSM 5120 and 5135* for red lights and siren policy.

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### **Light Use Visibility**

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

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

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

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### **Fire Engine Maintenance Procedure and Record**

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

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### **Engine Inventories**

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

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### **Water Tenders**

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#### **Water Tender Staffing Standards**

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#### **Water Tender Non-Tactical**

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

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#### **Water Tender Tactical**

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

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- 43 • **Qualifications:** ENOP, CDL (tank endorsement)
- 44 • **Staffing:** Tactical water tenders will carry a minimum crew of two:

- 1 • One ENOP
- 2 • One Engine Module Member

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#### 4 **Dozers/Tractor Plows**

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#### 6 **Dozer/Tractor Plow Training and Qualifications**

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

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#### 13 **Dozer/Tractor Plow Physical Fitness Standards**

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

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#### 19 **Dozer/Tractor Plow Operational Procedures**

- 20 • Agency owned and operated dozer/tractor plows will be equipped with  
21 programmable two-way radios, configured to allow the operator to monitor  
22 radio traffic.
- 23 • Agency dozer/tractor plows with non-red carded operators and all contract  
24 dozer/tractor plows will have agency supplied supervision when assigned to  
25 any suppression operations.
- 26 • Contract or offer-for-hire dozers must also be provided with radio  
27 communications, either through a qualified dozer/tractor plow boss or an  
28 agency-supplied radio. Contract dozer/tractor plows will meet the  
29 specifications identified in their agreement/contract.
- 30 • Operators of dozer/tractor plows and transport equipment will meet DOT  
31 certifications and requirements regarding the use and movement of heavy  
32 equipment, including driving limitations, CDL requirements, and pilot car  
33 use.

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#### 35 **All Terrain Vehicles (ATV)/Utility-Terrain Vehicles (UTV)**

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

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

- 43 • Specific authorization for ATV/UTV use is required.

- 1 ● All personnel authorized to operate an ATV/UTV must first complete
- 2 agency specific or manufacturers training in safe operating procedures and
- 3 appropriate PPE.
- 4 ● Re-evaluation/Re-certification - Operators shall be re-evaluated every three
- 5 years. Infrequent users (less than 16 hours of riding a year) shall have a
- 6 check ride prior to scheduled use of an ATV/UTV.

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8 **Required PPE includes:**

- 9 ● ATV Helmet - For ATV use, helmets must meet DOT or Snell M2005
- 10 certification. ATV Helmet - Helmets meeting DOT, ANSI-90, or SNELL
- 11 M-95 are required.
- 12 ● ATV/Fire Helmet - For wildland firefighters on fire line duty, helmets must
- 13 meet Snell SA2005 certification. Helmets worn by wildland firefighters on
- 14 fire line duty must be lined by Nomex®/Aramid type fire-resistant material.
- 15 ● Use of half “shorty” helmets require a JHA/RA for fireline use and must
- 16 include justification for its use. Refer to MTDC Tech Tip publication, A
- 17 Helmet for ATV Operators with Fireline Duties (0651-2350-MTDC).
- 18 ➤ ~~NPSUTV Head Protection - Helmets ~~worn by wildland firefighters on~~~~
- 19 ~~*fire line duty* must *be lined by Nomex®/Aramid type fire resistant*~~
- 20 ~~*material. Approved flight helmets such as SPH 4, SPH 5, or other*~~
- 21 ~~*comparable flight helmets are also authorized until September 30,*~~
- 22 ~~*2009.*~~
- 23 ● meet DOT or Snell M-2005 unless: UTV Head Protection - Helmets
- 24 meeting DOT, ANSI-90, or SNELL M-95 approved are required unless:
- 25 ● Approved ROPS Cab/brush cage is permanently installed on the vehicle
- 26 then a hard hat meeting NFPA 1977 and ANSI Z 89.1 standards may be
- 27 worn with chin straps secured in place under chin.
- 28 ● *BLM - UTV is equipped with Roll over protection system (ROPS) and is*
- 29 *operated on moderate terrain at moderate speeds then a hard hat meeting*
- 30 *NFPA 1977 and ANSI Z 89.1 standards may be worn with chin straps*
- 31 *secured in place under chin.*
- 32 ● *BLM - Administrative use (low speeds on smooth travel surfaces), e.g.*
- 33 *campgrounds, base camps; UTV operators are not required to wear hard*
- 34 *hats or a helmet.*
- 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 ● Eye protection (goggles, face shield, or safety glasses) based upon JHA/RA.
- 39 ● Leather gloves
- 40 ● Yellow aramid shirt
- 41 ● Aramid trousers
- 42 ● Wildland fire boots
- 43 ● ATV/UTV operator shall carry a personal communication device (e.g. two-
- 44 way radio, cellular phone, or satellite phone).

- 1 ● ATV - do not carry passengers on ATVs.
- 2 ● UTV - carry no more passengers in a UTV than the number of seats
- 3 installed by the manufacturer. The operator and each passenger must have
- 4 their own seatbelt and it must be fastened at all times when the vehicle is in
- 5 motion.
- 6 ● Loads shall be mounted and secured as to not affect the vehicle's center of
- 7 gravity. See agency specific policy for hauling liquid cargo.
- 8 ● Load weights shall not exceed manufacturer's recommendations.
- 9 ● ATV/UTV loading and transport - see agency specific policy.
- 10 ● A JHA/RA must be completed and approved by the supervisor prior to
- 11 vehicle operation.
- 12 ● **BLM** - Refer to *BLM Manual 1112-1, Chapter 27 Off-Highway Vehicles.*
- 13 *<http://web.blm.gov/internal/wo-700/wo740/policy.html>*
- 14 ● **FS** - Refer to ~~Refer to ID-6709FSH6709.11-2008-2~~
- 15 ● **FWS** - Use of hardhats requires a JHA for fireline use and must have
- 16 Project Leader approval and include justification for its use. Refer to
- 17 MTDC Tech Tip publication, A Helmet for ATV Operators with Fireline
- 18 Duties (0651-2350-MTDC). Exceptions to the above stated policy should
- 19 only be used in rare instances. Motorcycle helmets will be used for all
- 20 loading and unloading operations.
- 21 ● ~~NPS~~ - Refer to ~~Service Manual 243 FW 6 Off Road Utility Vehicle Safety.~~
- 22 ● ~~NPS~~ - Refer to Reference Manual 50B Occupational Health and Safety, ~~draft~~
- 23 Section 6.1 Off-Highway Vehicle Safety
- 24 *[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)*

#### 26 **Vehicle Cleaning/Noxious Weed Prevention**

27 To reduce the transport, introduction, and establishment of noxious weeds or  
28 other biological contaminants on the landscape due to fire suppression activities,  
29 fire suppression and support vehicles should be cleaned at a designated area  
30 prior to arriving and leaving the incident. Onsite fire equipment should be used  
31 to thoroughly clean the undercarriage, fender wells, tires, radiator, and exterior  
32 of the vehicle. The cleaning area should also be clearly marked to identify the  
33 area for post fire control treatments, as needed.

#### 35 **Fire Remote Automated Weather Stations**

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

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42 National resource FRAWS systems are cached at the National Interagency Fire  
43 Center (NIFC) and may be ordered through standard equipment resource  
44 ordering systems. Maintenance and recalibration of these stations must be

1 coordinated with the NIFC Remote Sensing/Fire Weather Support Unit  
2 (RSFWSU).

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

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

#### **Aerial Ignition Devices**

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

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#### **Ground Ignition Devices**

- 14 • *BLM - Guidance and direction for use and procurement of approved ground  
15 ignition equipment and the transportation and dispensing of drip torch fuel  
16 can be found in the Drip Torch Fuel Transportation and Dispensing  
17 Direction.*
- 18 • *NPS - Agency direction may be found in the 04/04/03 Memorandum Y14  
19 (9560) Aerial and Ground Ignition Equipment.*
- 20 • *FWS - specific information on ignition devices may be found in the January  
21 28, 2003 Memorandum: “Direction for Use and Purchase of Aerial and  
22 Ground Ignition Equipment.”*
- 23 • *FS - direction is found in FSH 5109.32a and 6709.11.*