

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.

- **FWS Fire Engine Staffing**
 - *Minimum staffing for Type 3 engine is one ENGB and two FFT2s.*
 - *Minimum staffing for Type 4, 5, 6 and 7 engines is one ENGB and one FFT2 (off Refuge).*
 - *Target staffing for Type 4, 5 and 6 engines is one ENGB, one ENOP and one FFT2.*
 - *Minimum staffing for Type 4, 5, 6 and 7 engines (on Refuge lands) is one ENOP and one FFT2.*
- **NPS - Staffing levels - Engines of any type when responding to off-park assignments, will be staffed by an ENGB and the appropriate number of**

- 1 *Module Members. Type 6 or 7 engines may be supervised by an ENOP on*
2 *in-park fires only. For an engine supervised by an ENOP when used for*
3 *initial attack (on in-park fires only), the ENOP must also be minimally*
4 *ICT5 qualified. Type 3, 4, or 5 engines, regardless of assignment location,*
5 *will be minimally supervised by an ENGB.*
- 6 • *NPS - Type 6 and 7 engines will have a minimum crew of two – an ENGB*
7 *or ENOP (in-park only), and an Engine Module Member.*
 - 8 • *NPS - Type 3, 4, or 5 engines will have a minimum crew size of three, an*
9 *ENGB, an ENOP and one Engine Module Member; or an ENGB and two*
10 *Engine Module Members.*
 - 11 • ***NPS - Working Capital Fund (WCF)/Non-WCF, Additional***
12 ***requirements***
 - 13 • *NPS - WCF engines are identified below.*
 - 14 • *NPS - All engines will be typed in accordance with the specifications*
15 *identified in the 410-1. Minimum engine staffing requirements:*
 - 16 ➤ *Approved WCF Type 6 or 7 engines during the defined fire season is*
17 *3 personnel effective 7 days per week.*
 - 18 ➤ *Approved Working Capital Fund (WCF) Type 3, 4, or 5 engines*
19 *during the defined fire season is 5 personnel effective 7 days per*
20 *week.*
 - 21 ➤ *Non-WCF engines (or WCF engines outside defined fire season),*
22 *Type 6 or 7 engines is a minimum of 2.*
 - 23 ➤ *Non-WCF engines (or WCF engines outside defined fire season),*
24 *Type 3, 4, or 5 engines is a minimum of 3.*
 - 25 • *FS - A Single Resource Boss may supervise a type 6 or 7 engine.*

27 **Engine Typing**

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

31 **Engine Water Reserve**

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

35 **Chocks**

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

40 **Fire Extinguisher**

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

1 Nonskid Surfaces

2 All surfaces will comply with National Fire Protection Association (NFPA)
3 1906 Standards for Wildland Fire Apparatus (6.4.3.) guidelines.

5 First Aid Kit

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

9 Gross Vehicle Weight (GVW)

10 Each engine will have an annually certified weight slip in the vehicle at all
11 times. Operators of engines and water tenders must ensure that the maximum
12 certified GVW is never exceeded, including gear, personnel and fuel. If the
13 proper number of personnel are not available during the weighing. The NFPA
14 1906 standard of 250 pounds for each person and their personal gear may be
15 used to calculate the loaded weight.

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

30 Speed Limits

31 Posted speed limits will not be exceeded.

33 Lighting

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

42 Emergency Light Use

43 Headlights and taillights will be illuminated at all times while the vehicle is in
44 motion. Emergency lighting will be used only during on site wildland fire
45 operations or to mitigate serious safety hazards. Overhead lighting and other
46 emergency lighting must meet state code requirements, and will be illuminated

1 whenever the visibility is reduced to less than 300 feet. Blue lights are not
2 acceptable for wildland fire operations.

3

4 **Light Use Visibility**

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

- 8 • *NPS - Vehicle Color and Marking. Vehicles dedicated to wildland fire*
9 *activities shall be white in color and have a single four-inch wide red*
10 *reflective stripe placed according to NFPA 1906 (NFPA 1906 7-6.2 1995*
11 *edition). The word "FIRE" red with white background color will be*
12 *centered on the front fenders. "FIRE" may also be placed on the front and*
13 *rear of the vehicle. The NPS Arrowhead will be placed on the front doors.*
14 *The size and placement of the arrowhead will be as specified in RM-9. An*
15 *identifier will be placed on the vehicle according to local zone or GACC*
16 *directions. Roof numbers will be placed according to local zone*
17 *procedures.*

18

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*
22 *Guide*" at:

23 <http://www.fs.fed.us/t-d/fueltran/> (Use t-d as user and password logins)

24

25 **Fire Engine Maintenance Procedure and Record**

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

32

33 **Engine Inventories**

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

37

38 **Water Tenders**

39

40 **Water Tender Operators Performance Standards**

41 **Water Tender Operator (Support)**

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

1 Water Tender Operator (Tactical)

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

- 5 • **Qualifications:** ENOP, CDL (tank endorsement)
- 6 • **Staffing:** Tactical water tenders will carry a minimum crew of two:
 - 7 ➤ One ENOP
 - 8 ➤ One Engine Module Member

10 Dozers/Tractor Plows**12 Dozer/Tractor Plow Training and Qualifications**

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

- 18 • *FWS - Dozer/tractor plow Operators must complete Intermediate Fire
19 Behavior (S-290) and the FWS Heavy Equipment Safety Training course
20 SAF2002 for dozer and/ or SAF2000 for Agriculture Tractor. Additional
21 training which supports development of knowledge and skills includes S-
22 232 and S-233 respectively, other positions that meet currency
23 requirements is none.*

25 Dozer/Tractor Plow Physical Fitness Standards

- 26 • *BLM/FWS - All employee dozer/tractor plow operators will meet the WCT
27 requirements at the Moderate level before accepting fire assignments.*
- 28 • *FS - FS dozer operators refer to 5134.32.*

30 Dozer/Tractor Plow Operational Procedures

- 31 • Agency owned and operated dozer/tractor plows will be equipped with
32 programmable two-way radios, configured to allow the operator to
33 monitor radio traffic.
- 34 • Agency dozer/tractor plows with non-red carded operators and all contract
35 dozer/tractor plows will have agency supplied supervision when assigned
36 to any suppression operations.
- 37 • Contract or offer-for-hire dozers must also be provided with radio
38 communications, either through a qualified dozer/tractor plow boss or an
39 agency-supplied radio. Contract dozer/tractor plows will meet the
40 specifications identified in their agreement/contract.
- 41 • Operators of dozer/tractor plows and transport equipment will meet DOT
42 certifications and requirements regarding the use and movement of heavy
43 equipment, including driving limitations, CDL requirements, and pilot car
44 use.

45

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

- 2 The operation of ATV/UTV is high risk and should be utilized only when their
3 use is essential to accomplishment of the mission and not as a matter of
4 convenience. Because of the high risk nature, agencies have developed specific
5 operational policy as highlighted below:
- 6 • Specific authorization for ATV/UTV use is required. Refer to current
7 agency policy.
 - 8 • All personnel authorized to operate an ATV must first complete agency
9 specific or manufacturer training in safe operating procedures and
10 appropriate PPE.
 - 11 • Refer to agency specific guidelines on required frequency of ATV
12 refresher training.
 - 13 • Required PPE includes:
 - 14 ➤ Helmet (DOT, ANSI-90, or SNELL M-95 approved). Use of half
15 “shorty” helmets require a JHA for fireline use and must include
16 justification for its use. Refer to MTDC Tech Tip publication, *A*
17 *Helmet for ATV Operators with Fireline Duties (0651-2350-MTDC)*.
 - 18 ➤ eye protection (goggles, face shield, or safety glasses)
 - 19 ➤ gloves
 - 20 ➤ long sleeves
 - 21 ➤ long pants
 - 22 • and leather boots (minimum 8” height).
 - 23 • The standard wildland hardhat will not be worn while operating an ATV.
 - 24 • Except in emergency situations, no passengers will be carried unless
25 vehicle is designed by the manufacturer to carry operator and passengers.
 - 26 • Operating speed will be appropriate for the conditions and terrain.
 - 27 • ATV training shall include safe operation while carrying loads.
 - 28 • Loads shall be mounted and secured as to not affect the vehicle’s center of
29 gravity.
 - 30 • Load weights shall not exceed manufacturer’s recommendations.
 - 31 • A risk assessment must be completed and approved by the supervisor prior
32 to vehicle operation.
 - 33 • **BLM** - Refer to *BLM Interim Policy - Utilization of Off-Road Vehicles*
34 *(ORVs) IM 2005-148*.
 - 35 • **BLM** - All operators shall be re-evaluated by an ASI Certified Trainer
36 every three years.
 - 37 • **FWS/NPS** - Exceptions to the above policy are:
 - 38 ➤ *SPH-4, SPH-5, or other comparable flight helmets meet the DOT*
39 *requirements and may be used in lieu of the helmets described above.*
 - 40 • **NPS** - All personnel authorized to operate an ATV must first complete
41 training in safe operating procedures from a nationally recognized source
42 such as the *ATV Safety Institute ATV Rider Course*
43 *<http://www.atvsafety.org> or as required by state statute.*
 - 44 • **NPS** - Annual refresher training must be conducted in accordance with an
45 approved JHA.

- 1 • *FS - Refer to Health and Safety Code Handbook 6709.11.*
2 • *FWS - Refer to Service Manual 243 FW 6 Off Road Utility Vehicle Safety.*

3

4 **Vehicle Cleaning/Noxious Weed Prevention**

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

12

13 **Fire Remote Automated Weather Stations**

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

19

20 National resource FRAWS systems are cached at National Interagency Fire
21 Center (NIFC) and may be ordered through standard equipment resource
22 ordering systems. Maintenance and recalibration of these stations must be
23 coordinated with the NIFC Remote Sensing/Fire Weather Support Unit
24 (RSFWSU).

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26 **Fuel Use, Storage and Transportation**

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

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32 **Aerial Ignition Devices**

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

35

36 **Ground Ignition Devices**

- 37 • *BLM - Guidance and direction for use and procurement of approved*
38 *ground ignition equipment and the transportation and dispensing of drip*
39 *torch fuel can be found in: Instruction Memorandum No. OF&A 2005-030,*
40 *7/20/05, Drip Torch Fuel Transportation and Dispensing Direction.*
41 • *NPS - Agency direction may be found in the 04/04/03 Memorandum Y14*
42 *(9560) Aerial and Ground Ignition Equipment.*
43 • *FWS - specific information on ignition devices may be found in the*
44 *January 28, 2003 Memorandum: "Direction for Use and Purchase of*
45 *Aerial and Ground Ignition Equipment."*
46 • *FS - direction is found in FSH 5109.32a and 6709.11.*

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