Chapter 14
Firefighting Equipment

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.

Firefighting Engine/Water Tender Common Standards

Driving Standard

Refer to driving standards in chapter 7.

- BIA – Refer to chapter 6 for BIA-specific motor vehicle policies. BIA and DOI policies require all personnel who operate a vehicle with a gross vehicle weight (GVW) over 26,000 pounds to have a valid commercial driver’s license (CDL).

Engine/Tactical Water Tender Water Reserve

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

Chocks

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

Fire Extinguisher

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

Nonskid Surfaces

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

First Aid Kit

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

- BLM – Fire First Response Kits will be carried in all Working Capital Fund 600-class fire vehicles (excluding trailers).
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Gross Vehicle Weight
Each engine and water tender will always have an annually certified weight slip in the vehicle. Weight slips will show individual axle weights and total GVW.
Operators of engines and water tenders must ensure that the maximum certified gross vehicle and axle weight ratings are never exceeded, including gear, personnel, and fuel. The National Fire Protection Association (NFPA) 1906 standard of 250 pounds per seat position for each person and their personal gear will be used to calculate the loaded weight.

• FS – Refer to FSH 7109.19, chapter 30 for calculation of rough road factor reduction for driving on rough or unsurfaced roads.

Speed Limits
Posted speed limits will not be exceeded.

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

Emergency Light Use
Emergency lighting will be used only during onsite wildland fire operations or to mitigate serious safety hazards. Overhead lighting and other emergency lighting must meet State code requirements and will be illuminated whenever the visibility is reduced to less than 300 feet.

• BLM/NPS/FWS/BIA – See agency chapters or policy for specific guidance.
• FS – See FSM 5120, FSM 5130, and FSH 5109.16 for red lights and sirens policy.

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

Mobile Attack (Pump and Roll)
Firefighters must be seated and belted within an enclosed cab or walking alongside the apparatus during mobile attack (pump and roll) operations. Riding, standing, or seated on the exterior of the apparatus is prohibited. Utilization of the NFPA 1906 “on-board pump-and-roll fire-fighting position” if equipped, is not permitted.
Firefighting Engines

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

Engine Typing
Engine typing and respective standards have been established by the National Wildfire Coordinating Group (NWCG) and are available at https://www.nwcg.gov/publications/pms200.

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Structure</th>
<th>Wildland Engines</th>
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</thead>
<tbody>
<tr>
<td>Components</td>
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<td>2</td>
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<tr>
<td>Tank Minimum Capacity (gal)</td>
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<td>300</td>
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<tr>
<td>Pump Minimum Flow (GPM)</td>
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<td>500</td>
</tr>
<tr>
<td>@ Rated Pressure (PSI)</td>
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<td>150</td>
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<tr>
<td>Hose 2½”</td>
<td>1200</td>
<td>1000</td>
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<tr>
<td>Hose 1½”</td>
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<td>500</td>
</tr>
<tr>
<td>Hose 1”</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ladders (per NFPA 1901)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Master Stream 500 GPM (minimum)</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>Pump and Roll</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Maximum GVWR (lbs.)</td>
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<td>-</td>
</tr>
<tr>
<td>Personnel (NWCG minimum)</td>
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<td>3</td>
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</tbody>
</table>


Fire Engine Staffing
For type 4, 5, 6, and 7 engines, minimum staffing is two individuals one of which is engine boss qualified.
For type 3 engines, minimum staffing is three individuals, including an engine boss.

- **BLM** – For BLM engine staffing requirements, see chapter 2.
- **NPS** – For NPS engine staffing requirements see chapter 3.

### Engine Inventories

An inventory of supplies and equipment carried on each vehicle is required to maintain accountability and to obtain replacement items lost or damaged on incidents. Refer to agency-specific requirements regarding standard inventory for engines.


### Water Tenders

#### Water Tender Typing

Water tender typing and respective standards have been established by NWCG. https://www.nwcg.gov/publications/pms200

<table>
<thead>
<tr>
<th>Water Tender Type</th>
<th>Support</th>
<th>Tactical</th>
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<tr>
<td></td>
<td>S1</td>
<td>S2</td>
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<td>Pump Minimum Flow (GPM)</td>
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<tr>
<td>@Rated Pressure (PSI)</td>
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<td>50</td>
</tr>
<tr>
<td>Maximum Refill Time (mins)</td>
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<td>20</td>
</tr>
<tr>
<td>Pump and Roll</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Personnel (min)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Water Tender Qualifications and Staffing Standards

- **Water Tender (Non-Tactical)**
  - **Qualifications:** CDL (tank endorsement)
    - **BLM** – Refer to the Federal Wildland Fire Qualifications Supplement.
  - **Staffing:** A water tender (non-tactical) may be staffed with a crew of one driver/operator when used in a support role as a fire engine refill unit or for dust abatement. These operators do not have to pass the work capacity test (WCT) but are required to take annual refresher training.
    - **BLM** – A WCF class-669, non-tactical water tender may be staffed with a crew of one driver/operator when it is used in a support role as a fire engine refill unit or for dust abatement. These operators will pass the moderate WCT, take BL-300/RT-301 and annual
refresher training, and possess a CDL with tank endorsement and air brake endorsement (if applicable).

- **Water Tender (Tactical)**
  Tactical use is defined as “direct fire suppression missions such as pumping hose lays, live reel use, running attack, and use of spray bars and monitors to suppress fires.”
  - **Qualifications:**
    - **BLM** – engine operator (ENOP), CDL (tank endorsement) and airbrakes endorsement (if applicable).
    - **NPS/FWS** – engine boss (ENGB), CDL (tank endorsement)
    - **FS** – firefighter, type 1 (FFT1), CDL
  - **Staffing:** Tactical water tenders will carry a minimum crew of two:
    - **BLM** A WCF class-669 tactical water tender shall be staffed with minimum crew of one engine operator (ENOP) and one firefighter, type 2 (FFT2).
    - **NPS/FWS** – One ENGB and one FFT2.
    - **FS** – One FFT1 and one FFT1/FFT2.

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**Dozers/Tractor Plows**

**Dozer/Tractor Plow Training and Qualifications**
Agency wildland fire dozers/tractor plows will be staffed with personnel that meet the training and experience standards for dozer operator (DZOP) or dozer operator initial attack (DZIA) per the *Federal Wildland Fire Qualifications Supplement*. While on fire assignments, all operators and support crew will meet personal protective equipment (PPE) requirements.

**Dozer/Tractor Plow Operational Procedures**
- Agency-owned-and-operated dozer/tractor plows will be equipped with programmable two-way radios, configured to allow the operator to monitor radio traffic.
- Agency and contract dozer/tractor plows will have agency-supplied supervision when assigned to any suppression operations.
- Contract dozers must be provided with radio communications, either through a qualified heavy equipment boss (HEQB) or an agency-supplied radio. Contract dozer/tractor plows will meet the specifications identified in their agreement/contract.
- Operators of dozer/tractor plows and transport equipment will meet DOT certifications and requirements regarding the use and movement of heavy equipment, including driving limitations, CDL requirements, and pilot car use.

**All-Terrain Vehicles/Utility-Terrain Vehicles**
The operation of all-terrain vehicles (ATV)/utility-terrain vehicles (UTV) can be high risk. The use of ATVs/UTVs should be evaluated to ensure that use is essential to accomplish the mission, rather than for convenience.
• **BLM** – BLM personnel will not use ATVs for any wildland fire management activity, including preparedness, suppression, prescribed fire, hazardous fuels reduction, post-fire rehabilitation, and emergency stabilization and restoration, regardless of incident jurisdiction or project/activity location. The State directors, assistant state directors and the Director, National Operations Center have the authority to approve exceptions to this policy on a case-by-case basis. All requests for exceptions must be in writing and will include:
  ○ A description of how the ATV is essential for the performance of official duties;
  ○ Analysis of the alternatives that were considered;
  ○ Justification for an ATV being the only viable alternative; and
  ○ Concurrence by the applicable field manager, district manager, district safety manager, and the state/center safety manager.
Cost is not a basis for approval of an exception and no exceptions may be made to the existing ban on industrial use of ATVs.

• **BIA** – All BIA programs will cease the procurement of ATVs used for wildland fire management activities (including preparedness, suppression, prescribed fire, hazardous fuels reduction, post-fire rehabilitation, and emergency stabilization and restoration). BIA personnel will not utilize ATVs for any wildland fire management activities, regardless of incident jurisdiction or project/activity location.

• **BIA** – Programs may continue to procure and utilize other commercially available UTVs, provided the vehicle has manufactured-installed seat belts, a steering wheel, is a multi-seat or newly available single-seat model, and is equipped with a certified rollover protection structure (ROPS) designed and installed by the original equipment manufacturer as standard equipment.

• **BLM/BIA** – Employees of cooperating agencies/entities may utilize ATVs on BLM/BIA incidents if allowed by their individual agency/entity policy. ATV/UTV operators will meet the training and certification requirements of their agency; employees certified by their agency will be considered qualified ATV/UTV operators regardless of incident jurisdiction. Common policy requirements for wildland fire operations are highlighted below:
  • A job hazard analysis (JHA)/risk assessment (RA) must be completed and approved by the supervisor prior to vehicle operation.
  • All personnel authorized to operate an ATV/UTV must first complete agency-specific or manufacturer-provided training in safe operating procedures and appropriate PPE.
  ○ **BLM** – BLM offices may use either UTV training that is commercially available from the Recreational Off-Highway Vehicle Association (ROHVA) or continue to use the current version (8/2018) of the BLM UTV Operator Field Training Range Cards to train their employees who use UTVs. If offices choose to use ROHVA’s driver course, they must continue to train employees on UTV loading/unloading, trailer
use, and winch operations as prescribed in lesson plans eight through
ten of the BLM UTV range cards prior to employees engaging in these
activities. This change does not affect the requirement for UTV riders
to complete the DOI Talent course, “Introduction to Utility Terrain
Vehicle Operation” as a prerequisite to the field training provided by
either ROHVA or the BLM range cards.

• Reevaluation/Recertification – Operators shall be reevaluated every three
years. Infrequent users (less than 16 hours of riding a year) shall have a
check ride prior to scheduled use of an ATV/UTV.

• Specific authorization for ATV/UTV use is required. All ATV/UTV
operations must hold a valid Motor Vehicle Operator’s Identification Card,
OF-346, or agency equivalent.

  ○ BLM – Upon completion of UTV training and operator certification
requirements, UTV operator (UTVO) will be placed on the employee’s
incident qualification card. Incident Qualifications and Certification System
(IQCS) certifying officials are responsible for verifying that UTV
operator qualifications are current, and that the UTVO qualification is
removed from the incident qualification card if training, certification,
or currency requirements lapse.

  ○ NPS/FWS – Upon completion of agency-specific ATV/UTV training
and operator certification requirements, All-terrain vehicle operator
(ATVO) will be placed on the employee’s incident qualification card.
IQCS certifying officials are responsible for verifying that ATV/UTV
operator qualifications are current, and that the ATVO qualification is
removed from the incident qualification card if agency-specific
training, certification, or currency requirements lapse.

  ○ NPS – All off-highway vehicle (OHV) operators (including ATV/UTV)
must hold a valid State motor vehicle operator’s permit. Operating
restrictions (e.g., use of corrective lenses) identified on the operator’s
permit must be adhered to while operating an OHV. NPS ATV
operators must be qualified at either the basic or advanced level as
described in Reference Manual-50B (RM-50B) depending on the
hazard potential of the operation. All ATV operators shall be provided
refresher training each year in accordance with a JHA and reevaluated
by an ASI-certified trainer every 3 years. The reevaluation shall be
documented. RM-50B, appendix B (ATV Operator
Accountability/Certification Tracking Record) may be used to
document the reevaluation. Further information on ATV/UTV use is
found in RM-50B.

  ○ BIA – Upon completion of UTV training and operator certification
requirements, UTV operator (UTVO) will be placed on the employee’s
Incident qualification card. IQCS certifying officials are responsible
for verifying that UTV operator qualifications are current, and that the
UTVO qualification is removed from the Incident qualification card if
training, certification, or currency requirements lapse.
• ATVs can only have a single rider—passengers are prohibited even if the ATV is designed for two riders.
• UTVs passengers are limited to the number of seats installed by the manufacturer. The operator and passenger(s) must use seatbelts while the vehicle is in motion.
• Operators must use required PPE while loading/unloading ATV/UTV.
• Cargo loads shall be loaded and secured as to not affect the vehicle’s center of gravity and shall not exceed manufacturer’s recommendations for maximum carrying capacity; and
• When transporting external fuel containers with a UTV/ATV, a 5 lb., class BC fire extinguisher must be secured to the UTV/ATV.

Required PPE

**ATV Head Protection for Wildland Fire Operations**

• ATV helmets must be always worn during ATV operations (on and off the fireline); and
• ATV helmets must meet Snell SA2010, SA2015, or DOT certification.
  ○ A ¾-face model meeting Snell SA2010, SA2015 certification is acceptable for use.
  ○ Use of half “shorty” helmets requires a JHA/RA for fireline use and must include justification for its use. Refer to the National Technology and Development Program (NTDP) formerly known as Missoula Technology and Development Center (MTDC) Tech Tip publication, *A Helmet for ATV Operators with Fireline Duties* (0651-2350-MTDC).

**UTV Head Protection for Wildland Fire Operations**

• Helmets must meet DOT, American National Standards Institute (ANSI) Z90.1; or Snell SA2010, SA2015 certification unless:
  ○ UTV is used for low speeds and smooth travel surfaces, administrative use (e.g., campgrounds, incident base camps) UTV operators are not required to wear helmets; or
  ○ UTV is equipped with approved rollover protection system (ROPS)
• **BLM** – A comprehensive and properly prepared RA of the specific conditions demonstrates no more than a medium residual risk level, then a helmet meeting NFPA 1977 or ANSI Z 89.1 type I, class G standards may be worn with chin strap secured in place under chin.
• **NPS** – Approved helmets are required for UTV operations that are rated moderate (amber) or high (red) using the “ORV Risk Assessment Tool” included in the NPS Off-Highway Vehicle Policy.
• **FWS** – Per 243 FW 6.6 B.1, a hardhat meeting NFPA 1977 or ANSI Z 89.1 standards may be worn with chin straps secured in place unless the risk assessment for the operation dictates wearing a securely fastened motorcycle helmet.
• **FS** – UTV helmet (for fire use): must meet the policy within the Safety Handbook (6709.11), chapter 70, 71.12; Exhibit 01 states “Specialized Equipment, such as ATVs, UTVs, Dirt Bikes, Snowmobiles (Department of
Transportation-approved helmet)." Wearing hardhats while driving or riding on a UTV is not allowed. Forest Service policy provides no exception to the helmet requirement for low speeds, smooth travel surfaces, or administrative use. UTV helmet (for fire use) requirements are the same as ATV use. Helmets must meet Snell, or DOT ANSI certification. A ¾-face model meeting Snell or DOT certification is acceptable for use. Use of half "shorty" helmets requires a JHA/RA for fireline use approved by the incident commander (IC) or relevant line officer and must include justification for its use. Refer to MTDC Tech Tip 5 publication, A Helmet for ATV Operators with Fireline Duties (0651-6 2350-MTDC).

- **BIA** – UTV helmet (for fire use) must be worn. Helmets must meet DOT, ANSI Z90.1: or Snell SA2010, SA2015 certification. Hardhats are not approved for wildland fire operations (non-administrative use).

**Eye Protection**

- Eye protection (goggles, face shield, or safety glasses) is not required for a UTV equipped with an original manufacturer windshield that protects the face from branches, flying debris, etc., unless otherwise required by an associated industrial use activity or JHA/RA.

**Other Protection**

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

- Leather or leather-/flame-resistant combination gloves. Flame-resistant flight gloves or NFPA-1977-compliant driving gloves can be used by heavy equipment operators, drivers, and fireline supervisors when not using fireline hand tools.
- National-Fire-Protection-Association-(NFPA)-1977 compliant, long-sleeved, flame-resistant shirt (yellow recommended).
- NFPA-1977-compliant, flame-resistant trousers.
- Wildland fire boots.
- Appropriate head protection as described above.
- **FS** – Shirt, trousers, and gloves used by USFS personnel must meet Forest Service specification 5100-91 (shirt), 5100-92 (trousers), 6170-5 (gloves), or be NFPA 1977 compliant.

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

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

- **BLM** – Refer to BLM Handbook 1112-1, chapter 17.
- **FWS** – Refer to 321 FW 1.
Vehicle Cleaning/Invasive Species Prevention

Refer to chapter 11 for guidance on minimizing potential transmission of invasive species.

Incident Remote Automated Weather Stations

Incident remote automated weather stations (IRAWS – NFES 5869) are readily deployable, portable weather stations that may be utilized in unprepared locations to monitor local weather conditions. IRAWS are intended for use on or near the fireline or at other all-hazards incidents and are installed by National Interagency Fire Center (NIFC) technicians and operated as desired by fire behavior analysts (FBAN) and/or incident meteorologists (IMET) to record and distribute real time weather data.

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

Aerial Ignition Devices

Information on types of aerial ignition devices, operational guidelines, and personnel qualifications may be found in the NWCG Standards for Aerial Ignition (PMS 501) available at https://www.nwcg.gov/publications/501.

Ground Ignition Devices and Transporting/Dispensing Fuel

For ground ignition devices, follow the NWCG Standards for Ground Ignition Equipment (PMS 443) for operational guidelines, personnel qualifications, and equipment selection. https://www.nwcg.gov/publications/443

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

For transporting and dispensing fuel, follow NWCG Standards for Transporting Fuel (PMS 442) found at https://www.nwcg.gov/publications/442 or agency-specific guidance.

- **BLM** – All Drip torches must meet United States Forest Service (USFS) specification 5100-614.
- **NPS** – Follow the Forest Service standard for military style jerrican (UN 3A1) (PMS 442, page 8).
- **FS** – Direction is found in FSH 6709.11.