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.

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.

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 policy requires all personnel who operate a vehicle with a Gross Vehicle Weight (GVW) over 26,000 pounds to have a valid 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. ABC rated (minimum) 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.
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First Aid Kit
Each engine/water tender shall carry, in a clearly marked compartment, a fully equipped 20-25 person first aid kit.

Gross Vehicle Weight (GVW)
Each engine and water tender 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 gross vehicle and axle weight ratings are never exceeded, including gear, personnel, and fuel. The 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 shall be illuminated at all times 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 fire.

Emergency Light Use
Emergency lighting will be used only during on site 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 – See agency chapters or policy for specific guidance.
- FWS – Refer to Service policy 621 FW 1.
- FS – See FSM 5120, FSM 5130, and FSH 5109.16 for red lights and siren 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 walk 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 NWCG (reference the Wildland Fire Incident Management Field Guide (PMS 210), Chapter 4).

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Structure</th>
<th>Wildland Engines</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Components</strong></td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
</tr>
<tr>
<td>Tank Minimum Capacity (gal)</td>
<td>300</td>
<td>500</td>
</tr>
<tr>
<td>Pump Minimum Flow (gpm)</td>
<td>1000</td>
<td>500</td>
</tr>
<tr>
<td>@ Rated Pressure (psi)</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Hose 2½”</td>
<td>1200</td>
<td>1000</td>
</tr>
<tr>
<td>1½”</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>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 Min.</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>Pump and Roll</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Maximum GVWR (lbs.)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Personnel (NWCG min.)</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>
• FS – See https://www.fs.fed.us/fire/equipment/engine-models/models.html for description of Forest Service national engine standards.

**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. The standard inventory for engines is found in Appendix M.

**Water Tenders**

**Water Tender Typing**

Water tender typing and respective standards have been established by NWCG (reference the *Wildland Fire Incident Management Field Guide* (PMS 210), Chapter 4).

<table>
<thead>
<tr>
<th>Water Tender Type</th>
<th>Support</th>
<th>Tactical</th>
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</thead>
<tbody>
<tr>
<td>Requirements</td>
<td>S1</td>
<td>S2</td>
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<tr>
<td>Tank Capacity (gal)</td>
<td>4000</td>
<td>2500</td>
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<tr>
<td>Pump Minimum Flow (gpm)</td>
<td>300</td>
<td>200</td>
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<tr>
<td>@Rated Pressure (psi)</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Max. Refill Time (mins)</td>
<td>30</td>
<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)
  
  o Qualifications: CDL (tank endorsement)
    
    * BLM – Refer to the Federal Wildland Fire Qualifications Supplement.
  
  o Staffing: A water tender (non-tactical) 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 do not have to pass the Work Capacity Test (WCT) but are required to take annual refresher training.
• Water Tender (Tactical)
  Tactical use is defined as “direct fire suppression missions such as
  pumping hoselays, live reel use, running attack, and use of spray bars and
  monitors to suppress fires.”
  o Qualifications:
    ▪ BLM – ENOP, CDL (tank endorsement)
    ▪ NPS/FWS – ENGB, CDL (tank endorsement)
    ▪ FS – FFT1, CDL
  o Staffing: Tactical water tenders will carry a minimum crew of two:
    ▪ BLM – One ENOP and one FFT2.
    ▪ BLM – 668 Super Heavy Tactical Tenders will be staffed with
      one engine boss and one engine crewmember.
    ▪ NPS/FWS – one ENGB and one FFT2.
    ▪ FS – One FFT1 and one FFT1/FFT2.

Dozers/Tractor Plows

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

Dozer/Tractor Plow Physical Fitness Standards
All employee dozer/tractor plow operators will meet requirements stated in the
Federal Wildland Fire Qualifications Supplement.

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.
The operation of ATV/UTVs can be high risk. The use of ATV/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 after January 1, 2018.

- **BIA** – Effective immediately, 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). Any ATV currently in service may continue to be utilized for non-industrial wildland fire management activities/operations until January 1, 2019. After this date, 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 utility terrain vehicles (UTVs), provided the vehicle has manufactured-installed seat belts, a steering wheel, is a multi-seat or newly available single-seat model (e.g., Polaris Ace) and is equipped with a certified roll-over protection structure (ROPS) designed and installed by the original equipment manufacturer as standard equipment.

- **BLM** – Employees of cooperating agencies/entities may utilize ATVs on BLM incidents if allowed by their individual agency/entity policy.

Because of the high risk nature, agencies have developed specific operational policy (refer to current agency 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 JHA/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.
- Re-evaluation/Re-certification – Operators shall be re-evaluated 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.
o **BLM** – Upon completion of agency-specific UTV training and operator certification requirements, Utility-Terrain Vehicle Operator (UTVO) will be placed on the employee’s Incident Qualification and Certification (IQCS) Card (Red Card). IQCS Certifying Officials are responsible for verifying that UTV operator qualifications are current, and that the UTVO qualification is removed from the Red Card if agency-specific training, certification, or currency requirements lapse.

o **NPS/FWS/BIA** – 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 and Certification (IQCS) Card (Red Card). IQCS Certifying Officials are responsible for verifying that ATV/UTV operator qualifications are current, and that the ATVO qualification is removed from the Red Card if agency-specific training, certification, or currency requirements lapse.

o **NPS** – All Off-Highway Vehicle (OHV) operators (including ATV/UTV) must hold a valid state Motor Vehicle Operator’s Permit. Operating restrictions identified on the operator’s permit must be adhered to while operating an OHV (e.g., use of corrective lenses, etc.). NPS ATV operators must be qualified at either the Basic or Advanced Level as described in 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.

• ATVs can only have a single rider—passengers are prohibited even if ATV is designed for two riders.
• UTVs passengers are limited to the number of seats installed by 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 worn at all times during ATV operations (on and off the fireline); and
• ATV helmets must meet Snell SA2010, SA2015, or DOT certification.
  o A ¾ face model meeting Snell SA2010, SA2015 certification is
    acceptable for use.
  o Use of half "shorty" helmets requires a JHA/RA for fireline use and
    must include justification for its use. Refer to 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, ANSI Z90.1; or Snell SA2010, SA2015
  certification unless:
  o 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 hardhats or helmets; or
  o UTV is equipped with approved Rollover Protection System (ROPS),
    and:
    ▪ **BLM** – A comprehensive and properly prepared RA of the
      specific conditions demonstrates no more than a medium residual
      risk level, then a hard hat meeting NFPA 1977 or ANSI Z 89.1
      2009 Type I, Class G standards may be worn with chin straps
      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) – Helmets must have Snell SA
      certification. 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 (FSH 6709.11, Chapter 10).

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

If operating 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:

- Refer to Instruction Memorandum No. WO 2017-014, Transporting Utility Terrain Vehicles (UTVs) in Pick-up Trucks.

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-risk incidents, and are installed and operated as desired by Fire Behavior Analysts (FBAN) and/or Incident Meteorologists (IMET) to record and distribute real time weather data.

National resource IRAW systems are cached at the National Interagency Fire Center (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 *Interagency Aerial Ignition Guide* (PMS 501) available at https://www.nwcg.gov/publications/501.

Ground Ignition Devices and Transporting/Dispensing Fuel

For ground ignition devices, follow the *Interagency Ground Ignition Guide* (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 the *Interagency Transportation Guide for Gasoline, Mixed Gas, Drip-Torch Fuel, and Diesel* (PMS 442) found at https://www.nwcg.gov/publications/442 or agency-specific guidance.

- **NPS** – Follow the Forest Service standard for military style jerrican (UN 3A1) (Page 8, PMS 442).
- **FS** – Direction is found in FSH 6709.11.