

PERSONAL PROTECTIVE EQUIPMENT (PPE) – a short guide for wildland firefighters

Fighting fire is not only physically demanding work, but can be physically punishing as well. Fighting fire without exposing personnel to hazards is impossible, but in most cases personal injuries can be avoided.

The safety gear the firefighter is issued is designed to help protect him or her when and if it is properly used and maintained. Proper use in conjunction with skill and common sense can prevent personal injuries.



REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE)

- ✓ Flame resistant clothing
- ✓ Proper footwear
- ✓ Hard hat
- ✓ Leather gloves
- ✓ Safety glasses
- ✓ Fire shelter

I. FLAME-RESISTANT CLOTHING

Nomex™ (a trade name for arimid fiber clothing) is flame resistant but not fireproof. It offers no insulation to protect against burns.

Wearing flame resistant fabrics may add to body heat stress. Electrolytes (potassium, sodium and chloride) and water should be replaced in the body. Some items that will replace lost electrolytes are fresh fruits, vegetables and citrus fruit juices.

Keep Nomex™ clean since it loses its fire retardant capabilities if foreign substances are on or in the fibers. Wash in soap and water separate from other clothing.

Replace fire resistant clothing if ripped or torn.

Trousers (Flame resistant)

Do not wear trousers made out of synthetic materials. Trousers should be made out of flame resistant material. They should have a loose fit on the firefighter so that they do not restrict movement.

Trousers need to be the proper length. They need to fall over the boot tops to keep out embers. They should not be cuffed, so embers do not get hidden in the folds of the fabric. Do not cut the bottom of the trousers off. Doing so will cause fraying which is dangerous around open flame.

A wide, high quality leather belt should be worn if possible.

Shirts (Flame-resistant)

Wear a long-sleeved flame-resistant shirt that will secure at the collar and wrists for maximum protection. Shirt sleeves should not be rolled up when on the fireline. Both shirts and coveralls should be kept buttoned to protect the exposed body parts. Clothing should be unbuttoned or loosened only on the supervisor's advice.

Underclothes

Avoid undergarments made of 100% or a high percentage of polyester, nylon or acrylic. It is recommended that employees wear a short sleeved t-shirt, underwear and socks under fire clothing and boots. T-shirts and underwear should be 100% cotton or a 100% flame-resistant blend. Socks should be cotton, wool or a blend of flame resistant fibers.

Jackets

If personnel need to wear a jacket on the fireline, they should wear a flame-resistant brush jacket. **Never** wear synthetic windbreakers or jackets over flame-resistant shirts. If flame-resistant shirts are large enough, personnel can layer cotton or nonsynthetic clothing under the shirt.

II. BOOTS/FOOTWEAR

The feet are one of the most important parts of the firefighter's body. Boots should be selected that are high quality, fit well and meet recommended specifications. Firefighters should break in boots before wearing them on long assignments, otherwise painful blisters can form on the feet.

It is recommended that firefighters wear two pairs of socks, an inner pair of light weight cotton socks and an outer pair of wool socks.

Recommended Boot Specifications

- **Leather boots** with a minimum 6 inch top and skid resistant soles (rubber boots are allowed in wet terrain). Where activities involve the use of a chain saw, the boots must be made of cut resistant material and support the ankle (6" minimum height) as per OSHA 1910.266. To qualify as a cut resistant boot, the cut resistant material can be incorporated in the boot, a cut resistant sock can be inserted in the boot, the boot could be covered by cut resistant material or any other means as approved to comply with being cut resistant.
- **Soles** should be made of hard-rubber with non-slip lugs or tractor tread such as a Vibram sole. This will allow for maximum traction and prevent melting upon exposure to normal fireline conditions. Soles should not be made of composition rubber or plastic which have low melting points. Boots with smooth hard rubber soles or without a well defined tread can be used; however, these soles have a tendency to slip on smooth rock, log and pine needle surfaces which are often found on fires.
- **Laces** are recommended to be made of leather or "rawhide".
- **Stitching** should be of waxed linen thread, not a synthetic material such as nylon which melts easily. Visually inspect the stitching. Waxed linen thread is relatively thick, appears waxy and is usually white or black. Nylon or other synthetic materials are smaller in diameter, usually shiny and will melt or burn when heat is applied to a loose thread end.

Rubber boots

In Minnesota, some fires in lowland or peat areas may require the use of rubber boots by firefighters. Caution needs to be exhibited by the wearer when working around hot spots. Limit the time in these areas or the rubber boots could burn or disintegrate before the wearer becomes aware of it.

Maintenance

All boots should be kept clean. Apply boot grease as necessary to leather boots to keep the leather soft. Insure that boots are in good repair. This should include inspecting and replacing soles, insuring all stitching is present and checking the condition of laces.

III. HARD HAT

Hard Hat

Hard hats will provide protection when properly worn. Do not wear hard hats backwards. Never wear metal hard hats. The hard hat is provided for your protection, always wear it with the internal suspension.



Hard hats should be equipped with chin straps. Keep headband and chin straps clean. Do not clean headbands or plastic hard hats with solvents. Use soap and water.

Head Lamp

Using a head lamp for illumination is a common practice when working at night. The head lamp is designed to allow both hands to be free for work. For night operations point the light beam directly at your activity or work.

Always use fresh batteries in your head lamp. Four “AA” may not last an entire shift so be sure to carry spare batteries. Keep the lens clean and take precautions against lens breakage.

IV. OTHER PERSONAL PROTECTIVE EQUIPMENT

Eye protection

Eye protection such as goggles and safety glasses are a provided and necessary part of all firefighter’s apparel. Personnel need protection from flying debris from high winds and helicopter blades, chips and debris from chain saws and nozzles.

Hearing protection

Earplugs or ear “muffs” are required when firefighters are working around chain saws, pumps, helicopters and other very noisy equipment and areas where sound levels exceed 85 decibels.

Gloves

Leather gloves are standard for most work. Gloves should fit properly to prevent blisters.



Fire Shelters

Fire shelters are **required** to be worn unless an employee is specifically assigned to a vehicle, in which case they must wear a shelter when away from that vehicle or when beyond the protective reach of hoses from that vehicle.

Fire shelters should be worn vertically on your side or horizontally under your pack.

Training in proper use and deployment of fire shelters is required annually by all wildland fire agencies for anyone working in a line position on a wildfire or prescribed burn.

Always inspect a fire shelter when it is issued to you. Inspection is recommended at the beginning and end of each fire season and every 14 days during the fire season. Follow the inspection process outlined in the publication “Your Fire Shelter”.

Take proper care of your fire shelter since it could save your life. Keep it away from sharp objects that could puncture it. Do not load heavy objects on top of it or sit on it. Do not lean against objects when wearing the shelter. Always use the hard plastic liner in the carrying case.



Canteens

Canteens are for drinking water only. Always keep well hydrated when fighting a fire or conducting a prescribed burn. During your work shift, drink often and keep your canteens filled. During hot work it is common to lose more than a quart of sweat an hour.

V. IMPORTANT THINGS TO REMEMBER

Never begin an operational period with clothing or PPE that has gas, oil, or other flammable material on it.

Chain saw chaps are **required** whenever an individual is assigned to operate a chain saw.

All employees are responsible for the proper use and maintenance of issued property. The agency will not be held responsible for any personal gear not necessary for use in fire activity.

VI. OBTAINING PPE

Personal Protective Equipment is available to purchase or borrow from the Northeast Interagency Fire Cache in Grand Rapids, Minnesota. All borrowed equipment and PPE must be returned immediately after use or you will be billed. Contact your nearest DNR Area Forestry office or the cache at 218-327-4579 for ordering information.

References used in this document:

- S-130 Firefighter Training Course
- Boots for Forest Fire Fighters
- USDA Forest Service Health and Safety Code Handbook
- Your Fire Shelter, 1995 Edition
- Minnesota Department of Natural Resources Operational Order #47

