Personal Protective Equipment in the Fire Service

Introduction

This tip sheet provides information on the main types of personal protective equipment firefighters wear and how each type can help reduce exposures to carcinogens (cancer-causing chemicals or agents). This tip sheet also includes industry standards and good practices for each type of personal protective equipment. The guidance provided in this document is primarily for structural firefighters. For information on wildland firefighting, please refer to Wildland Firefighting Cancer Awareness.

Personal protective equipment is generally considered the least effective type of control measure, as it depends on the worker to use and care for it correctly. However, because firefighters often face unknown conditions in emergency situations, personal protective equipment is a critical control measure that provides significant protection against exposures to carcinogens.

Key Messages

- Personal protective equipment is the last line of defence against hazards in the hierarchy of controls. In the case of firefighters, however, personal protective equipment plays a critical role in reducing exposure to hazards that can cause occupational cancer.
- Properly fitting personal protective equipment is key to ensuring protection against exposures. It is the employer's responsibility to make sure personal protective equipment fits and works effectively for workers of all body types and genders. If workers have concerns about the fit of their personal protective equipment, they should address them with their supervisor.
- Employers are responsible for making sure workers use the appropriate personal protective equipment. They should provide instruction on how to maintain and clean equipment and educate and train workers on its proper use.
- Always refer to applicable National Fire Protection Association (NFPA) Standards and recognized industry good practices, including manufacturer instructions, for information on each piece of personal protective equipment, including how to care for and inspect it.

Refer to CCOHS' OSH Answers Fact Sheet Designing an Effective PPE Program for more information about personal protective equipment.

Contaminated Personal Protective Equipment

The risk of exposure to carcinogens does not end once a crew leaves a fire scene. Soot, ash, and other harmful chemicals encountered during firefighting contaminate and soil personal protective equipment. These chemicals remain on personal protective equipment for long periods of time, introducing another source of exposure to carcinogens.

Once personal protective equipment has become contaminated, it can start to release harmful chemicals back into the air, known as "off-gassing." Contaminated gear can continue to off-gas and release carcinogens after a fire incident. This can prolong a firefighter's exposure and lead to secondary exposure to carcinogens.

In firefighting, dirty uniforms are sometimes viewed as a "badge of honour" representing hard work and bravery. To shift this harmful perception, leaders should provide education on the health risks associated with contaminated personal protective equipment, ensure proper cleaning protocols are followed, and intentionally acknowledge courage, teamwork, and professionalism without tying recognition to exposure or contaminated equipment.

Good practices for handling contaminated equipment and off-gassing:

- Handle contaminated equipment in a well-ventilated area.
- Properly bag and seal contaminated equipment when transporting it and store it in an unoccupied compartment on the apparatus (fire vehicle).
- Follow gross decontamination procedures.
- Do not bring contaminated equipment into the fire station's living quarters.

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- Do not bring contaminated equipment into your home or personal vehicle.
- Use personal protective equipment, such as an N95 respirator and nitrile gloves, during gross decontamination when off-gassing can occur.
- Decontaminate the inside of the fire vehicle after every incident response.

Care and Maintenance of Personal Protective Equipment

- Personal protective equipment must be cleaned, maintained and inspected according to the manufacturer's directions and applicable NFPA standards. Properly clean all personal protective equipment, including flash hoods, gloves, helmets, respiratory protection, face shields, and footwear.
- Clean personal protective equipment in designated, well-ventilated areas.
- Use appropriate personal protective equipment, such as safety glasses, an apron, gloves, and long-sleeves, when cleaning contaminated personal protective equipment. If there is potential for exposure to airborne contaminants, wear a respirator.
- Follow care and maintenance protocols after every call.
- Refer to your supervisors for advanced cleaning requirements, such as in the case of contamination with bodily fluids or asbestos.

Storing Personal Protective Equipment

- Store personal protective equipment in a dedicated, well-ventilated area.
- Store it away from ultraviolet radiation, fluorescent light, and direct sunlight to prevent materials from degrading.

Personal Protective Equipment and Gender

Personal protective equipment, such as bunker gear, is often designed to fit male body types. For other body types, a poor fit can lead to larger spaces and gaping. This can increase the risk of dermal (skin) exposure, impacting the equipment’s overall effectiveness. It’s important for organizations to consider and address ill-fitting personal protective equipment as part of their personal protective equipment program.

For more information, please refer to CCOHS’ OSH Answers Fact Sheet Personal Protective Equipment – Body Type and Gender Considerations.

Bunker Gear

Bunker gear provides an outer protective barrier to bare skin. By reducing the amount of material that can get onto a firefighter’s skin, the risk of dermal (skin) absorption lowers. This can help reduce overall exposure to carcinogens. Personal undergarments, made from appropriate material, may provide an additional layer of protection.

After responding to a fire, contaminated bunker gear poses a hazard due to off-gassing of contaminants. Gross decontamination is an essential step to reducing exposures from off-gassing, as well as properly storing gear.

Good practices for bunker gear:

- Use per- and polyfluoroalkyl (PFAS)-free personal protective equipment for firefighters as it becomes available.
- Follow your organization’s gross decontamination procedures.
- Perform specialized cleaning when gear has been contaminated with a biohazard, such as blood, or hazardous substances, such as asbestos. Speak with your supervisor for further direction.
- Select undergarments made from appropriate materials that do not introduce a new hazard.
- Do not leave contaminated gear in clean areas like living or sleeping quarters.
- Do not transport contaminated gear in vehicles without proper bagging.
- Do not transport contaminated gear in personal vehicles.

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Eye Protection

Eye protection blocks airborne contaminants, particles, ash, and soot from entering the eyes, which may lead to absorption into the bloodstream.

Good practices for eye protection:

- Wear eye protection that forms a seal around the eyes for an additional layer of protection.
- Select eye protection which allows you to see in all directions without any major obstructions in your field of view.
- Wear eye protection that has been individually assigned and fitted so that gaps between the edges of the eyewear and the face are kept to a minimum.
- Avoid wearing contact lenses.
- Remove eye protection by tilting the head forward, allowing for debris to fall forward.
- Wear eye protection with ultraviolet (UV) protection when working under the sun.

Footwear

In addition to providing protection from foot injuries, footwear protects the feet and ankles from dermal (skin) exposure to carcinogens. It creates a barrier between the feet and ankles and contaminated surfaces and debris.

Good practices for footwear:

- Keep contaminated boots out of green or cold zones (where contaminated equipment never enters), such as living quarters in the firehall.
- Follow your workplace’s gross decontamination procedure and the manufacturer’s directions for cleaning boots.
- Do not bring contaminated work boots into your home or personal vehicle.
- Follow workplace procedures or manufacturers’ instructions for drying boots.
- Store boots in a designated area away from living quarters and other green zones.

Gloves

Gloves provide a barrier to hands and wrists, reducing dermal (skin) absorption when touching contaminated surfaces or objects. They help to reduce the risk of dermal (skin) absorption of contaminants.

After responding to a fire, gloves may pose a hazard due to the off-gassing of contaminants. This highlights the importance of gross decontamination as an essential step to reducing the risk of exposure, as well as properly storing gear.

Good practices for gloves:

- Follow procedures for how to properly put on and remove gloves.
- Minimize contact with the outside of contaminated gloves.
- Use nitrile gloves when cleaning contaminated gear and equipment.
- Wash hands as soon as possible after handling gear and equipment.
- Do not transport contaminated gear in vehicles unless it is bagged.
- Do not transport contaminated gear in personal vehicles.

Helmet and Flash Hood

Helmets shield the head and scalp from falling soot and other harmful chemicals. Flash hoods worn underneath helmets offer an additional layer of protection to the head and neck and serve as a barrier against dermal (skin) absorption.

Good practices for helmets and flash hoods:

- Use particulate-blocking flash hoods, where available.
- Clean flash hoods after each use and inspect them for signs of damage.

Respiratory Protection

A self-contained breathing apparatus (SCBA) supplies clean air to the user from a compressed air tank or through an airline. SCBAs reduce the risk of breathing in chemicals, preventing absorption through the respiratory system and substances from entering the bloodstream.

Air-purifying respirators, such as N95s, half-face respirators, and full-face respirators may be used for respiratory protection. They protect workers by filtering particles out of the air they breathe, or by absorbing gases or vapours in a cartridge or canister.

Good practices for respiratory protection:

Self-contained breathing apparatus (SCBA):

- Remain on air when performing gross decontamination.
- After a fire, SCBAs should be cleaned as part of gross decontamination procedures. Follow the manufacturer's directions.
- Do not remove respiratory protection in a fire zone. After a fire event, smoke can continue to linger, leading to secondary exposure.
- Do not mix SCBA parts from different manufacturers.

Air-purifying respirators:

- Ensure N95s or the filter on respirators are not oversaturated and are in good working order.
- Remove any facial hair that comes between the sealing surface of the respirator facepiece and your face. Facial hair can cause respirators to leak around the face seal.
- Make sure you have been fit-tested before wearing a tight-fitting respirator. Fit testing makes sure there is an effective seal between the respirator and the face.
- Perform a user seal check whenever putting on a respirator. Do not wear a respirator that does not pass the seal check.
- Inspect your respirator before and after each use and during cleaning.
- Care must be taken to not contaminate the inside of the respirator or the user’s face during the donning (putting on) and doffing (taking off) process.
- At the end of each shift, store the respirator away from dust, sunlight, heat, extreme cold, excessive moisture, and chemicals.

This resource was developed in partnership with Health Canada to help raise awareness about the risk of occupational cancer for firefighters, in support of actions identified in the National Framework on Cancers Linked to Firefighting. This guidance reflects current understanding and may change as new information on firefighter health and safety is made available.