**Hazardous Materials: Managing the Incident, Fourth Edition**

**Chapter 8: Selecting Personal Protective Clothing and Equipment**

**Chief Concepts**

* Personal protective clothing and equipment is critical to the success of an organization’s hazardous materials response program. They are an integral element of the health and safety program and facilitate the ability of emergency responders to respond and control hazmat releases in a safe, efficient, and effective manner.
* An effective and comprehensive personal protective clothing program should address six fundamental elements: hazard identification, PPE selection and use, medical monitoring, training, inspection, and maintenance.
* Using a risk-based approach is critical when selecting personal protective clothing and equipment. All decisions should be well thought out and realistic, taking into account both the positive and negative effects of the tactical options being pursued.
* Emergency responders should be familiar with the policies and procedures of the Authority Having Jurisdiction (AHJ) so as to ensure a consistent approach for the selection and use of PPE.
* Chemicals may attack and pass through protective clothing materials via three methods: degradation, penetration, and permeation. Barrier compatibility charts are primarily based upon penetration and permeation testing.
* CPC materials are classified as either limited-use (disposable) garments or reusable garments.
* NFPA 1991, 1992, and 1994 provide design and performance criteria for chemical protective clothing. NFPA 1991 addresses chemical vapor protective ensembles, NFPA 1992 addresses liquid splash protective ensembles, and NFPA 1994 addresses protective ensembles for chemical/biological terrorism incidents.
* Chemical resistance data is described in terms of either

(1) chemical permeation/breakthrough times and rates

(2) cumulative permeation for a given test duration; or

(3) as “pass/fail” chemical penetration testing results.

Remember that the longer the breakthrough time or the lower the cumulative permeation value, the better the level of protection.

* The glove, boot, visors, and garment components of CPC will often be constructed of different materials or laminates. Be aware of which of these materials form the basis for the chemical barrier data provided by the manufacturer.
* Air purification devices should not be used at hazmat releases unless qualified personnel have first monitored the environment and determined that such devices can be safely used (per OSHA 29 CFR 1910.120[q][3][iv] and 1910.134). As a general rule, they should not be used for initial response operations at hazmat incidents and for emergency response operations involving unknown substances.
* Three basic types of protective clothing may be used at hazmat incidents:
  + Structural firefighting clothing is designed to protect against extremes of temperature, steam, hot water, hot particles, and the typical hazards of firefighting.
  + CPC is designed to protect skin and eyes from direct chemical contact. There are two basic types of CPC used: chemical splash protective clothing and chemical vapor protective clothing.
  + High temperature protective clothing is designed to protect against short-term exposures to high temperatures, such as proximity and fire entry suits.
* The EPA/OSHA levels of protection (A, B, C, D) reflect the design of the protective clothing ensemble and the respiratory protection provided, but do NOT provide an accurate description of the protection provided.
* Although SFC may offer sufficient protection to the wearer who is fully aware of the hazards being encountered and the limitations of the protective clothing, it is not designed to provide chemical splash or chemical vapor protection.
* Hazmat emergency responders are more likely to be injured as a result of heat stress than a chemical exposure. Many response agencies use some form of cooling technology to reduce the potential for heat stress injuries.
* Manufacturers’ guidelines for maintenance, testing, inspection, storage, and documentation should be followed for all PPE provided by the AHJ.