

Chapter 5: Personal Protective Equipment

Chapter 5: Personal Protective Equipment

Handout 25: PPE Donning/Doffing Procedures (continued)



Handout 25 PPE Donning/Doffing Procedures

Part B: Recommended Process for Doffing PPE (continued)

Correct	Incorrect	Step
		Disinfect and Remove Outer Gloves: Disinfect outer-gloved hands with either an EPA-registered disinfectant wipe or with ABHRs. Remove outer gloves, taking care not to contaminate the inner glove during the removal process. Discard the outer gloves in the appropriate receptacle.
		Inspect and Disinfect Inner Gloves: Inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears. If an inner glove is visibly soiled, cut, or torn, then disinfect the glove with either an EPA-registered disinfectant wipe or with ABHRs. Then remove the inner gloves, perform hand hygiene with ABHRs on bare hands, and don a clean pair of gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner-gloved hands with either an EPA-registered disinfectant wipe or with ABHRs.
		Doff Rubber Boots and Outer Protective Suit: Remove and place in the appropriate receptacle. Depending on suit design and location of fasteners, the cleanup worker can either untie fasteners, receive assistance by the trained observer's assistant to unfasten the suit, or gently break fasteners. When removing the outer suit, slowly and carefully reach for the zipper or fasteners and unzip or unfasten the outer suit completely before rolling down and turning inside out if possible. Avoid contact of the outer surface of the outer suit with the outer surface of the inner suit during removal. Pull inner suit away from the body, rolling inside out and touching only the inside of the suit. Carefully dispose of the suit in the appropriate receptacle.
		Disinfect Inner Gloves: Disinfect inner gloves with either an EPA-registered disinfectant wipe or with ABHRs.
		Remove PAPR Battery: Remove the PAPR battery (if a PAPR is used), including the duct tape belt, and place the battery in a container or area designated for the collection of PAPR components. Place the tape in the appropriate receptacle.
		Doff Inner Suit: Slowly and carefully reach for the zipper or fasteners and unzip or unfasten the inner suit completely before rolling down and turning inside out. Avoid contact of the outer surface of the disposable inner suit with skin, undergarments, or any other surface during removal. Pull inner suit away from the body, rolling inside out and touching only the inside of the suit. Carefully dispose of the suit in the appropriate receptacle.

Handout 25: PPE Donning/Doffing Procedures (continued)



Handout 25 PPE Donning/Doffing Procedures

Part B: Recommended Process for Doffing PPE (continued)

Correct	Incorrect	Step
		Disinfect Inner Gloves: Disinfect inner gloves with either an EPA-registered disinfectant wipe or with ABHRs.
		Doff Respirator: Cleanup workers can remove their respirator, being careful not to touch inside the respirator or their face.
		Disinfect and Remove Inner Gloves: Disinfect inner-gloved hands with either an EPA-registered disinfectant wipe or with ABHRs. Remove and discard gloves, taking care not to contaminate bare hands during removal process.
		Perform Hand Hygiene: Perform hand hygiene with ABHRs.
		Shower: Showers are required using antibacterial soap. Disposable towels must be provided for drying off and placed in the appropriate receptacle after use.
		Protocol Evaluation/Medical Assessment: Either the infection preventionist, infectious disease specialist, occupational safety and health coordinator, or their designee on call at the time, should meet with the cleanup worker to review the activities performed, to identify any concerns about protocols and to record worker's level of fatigue.

Chapter 5: Personal Protective Equipment

Summary



10
Minutes

Summary

Distribute *Chapter 5: Things to Remember.*

Explain that the *Things to Remember* document is a take-home list of information that can be used for reference or self-study. Note that this document provides information about the chapter's learning objectives and may be used as a study guide for the end-of-course assessment.



Chapter 5:
Things to Remember

Display Slides 2 to 5 and briefly review the chapter objectives with the class. Review the information on the *Things to Remember* handout for each objective. Ask participants if they are comfortable with their knowledge about, or ability to do, each of the objectives, or if they need review or additional support on any of the items listed.



SL 2 to 5

Ask the participants if they have any questions regarding any other topics of the chapter.

Address any questions or concerns.



PG: 5-58 to 5-59

Chapter 5: Things to Remember



Chapter 5: Personal Protective Equipment Things to Remember

1. The *assigned protection factor (APF)* is the amount a respirator leaks, as assigned by OSHA. An APF is based on the assumption that the respirator is working properly, is worn correctly, and fits the wearer. The lower the APF, the lower your protection. The higher the APF, the higher your protection. APF is calculated by dividing the concentration of airborne contaminants outside the respirator by the concentration inside the respirator. The maximum use concentration (MUC) is the level of contamination that, if exceeded, will cause you to be exposed above the PEL (overexposed). In other words, the MUC is the highest exposure level of a contaminant or a group of contaminants for which a specific respirator can be used safely. At no time should you use a respirator in an environment that exceeds the MUC. The MUC is calculated by multiplying the APF of the respirator that is going to be used by the PEL of the chemical or substance the respirator is going to be used against.

2. The following types of respirators are common in infectious disease work:

Respirator	Features	APF
Half-face APR	Covers half of face from nose to below chin; one or two filters	10
Full-face APR	Covers full face from forehead to below chin	50
Powered Air-purifying Respirator (PAPR)	Battery-operated blower draws air through filter into face-piece; constant flow rate of 4–6 cf/m; slight “positive pressure” inside face-piece	Half-face 50 Full-face 1,000

3. There are two basic types of respirators that you can use to protect yourself against airborne contamination: air-purifying respirators (APRs) and atmosphere-supplying respirators (ASRs). APRs rely on the air in your work environment as your source of breathing air, and clean the air you breathe by filtering or removing contamination from the air before it enters your lungs. ASRs supply you with safe breathing air from a cylinder on your back or a hose connected to a source of safe air. There are two types of ASRs. Supplied air respirators (SARs) provide air delivered by an airline connected to a safe air source. Self-contained breathing apparatus (SCBA) provide air that is supplied by a compressed air cylinder on your back.

Chapter 5: Personal Protective Equipment

Chapter 5: Things to Remember (continued)



Chapter 5: Personal Protective Equipment

Things to Remember

4. There are several potential limitations of APRs, including PAPRs, to be aware of:
 - **Oxygen-Deficient Atmospheres:** You cannot wear an APR in any atmosphere that is oxygen-deficient or has the potential to become so.
 - **IDLH Concentrations:** An APR should never be worn in an immediately dangerous to life and health (IDLH) atmosphere.
 - **Filter/Cartridge Life:** The service life of filters, cartridges and canisters is limited by their ability to block or remove contaminants.
 - **Cartridge/Canister Efficiency:** While one cartridge may be very efficient for some chemicals, it allows others to pass through quickly.
 - **Humidity/Temperature:** Breakthrough can occur more quickly under conditions of high humidity and temperatures.
 - **Usage/Change-Out:** The useful life of a cartridge or canister is limited once the cartridge package is opened.
 - **Eye Protection:** Since you have no eye protection when wearing a half-face APR, you must wear safety glasses, goggles, or a face shield if any hazards that may injure your eyes are present.
5. APRs are typically manufactured to use two basic types of purifying elements: Particulate filters and sorbent cartridges and canisters. Particulate filter respirators are used for protection against solid particles, dusts, fumes, and/or mists. They do not protect against gases and vapors. Sorbent cartridges and canisters are used with APRs to protect you from exposure to air that is contaminated with toxic vapors and gases. While particulate filters are effective for nearly all types of particles, sorbent cartridges and canisters are designed to protect against specific types of contaminants. Cartridges are designed to be used individually or in pairs on half and full face-pieces, and their service life is rather short. Canisters contain larger amounts of sorbent material. Therefore, they are bigger, can usually be used for a longer period of time, and are worn in situations where the concentration of gases or vapors is higher.
6. OSHA lists the following requirements for an effective respiratory protection program:
 1. Procedures for selecting respirators for use in the workplace.
 2. Medical evaluations of employees who are required to use respirators.
 3. Fit-testing procedures for tight-fitting respirators.
 4. Procedures for proper use of respirators in routine situations and in reasonably foreseeable emergencies.
 5. Procedures and schedules for cleaning, storing, inspecting, repairing, discarding, and otherwise maintaining respirators.
 6. Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators.
 7. Employee training in the respiratory hazards to which they are potentially exposed during routine and emergency situations.
 8. Employee training in the proper use of respirators, including the following:
 - Donning and doffing (putting on and taking off)
 - Limitations
 - Maintenance
 9. Procedures for regularly evaluating the effectiveness of the program.

Chapter 5: Things to Remember (continued)



Chapter 5: Personal Protective Equipment Things to Remember

7. A qualitative fit-test (QLFT) or quantitative fit-test (QNFT) must be performed on all negative- or positive-pressure tight-fitting respirators before you wear them. A qualitative fit-test (QLFT) is a pass/fail fit-test used to check respirator fit that relies on your response to a test agent. It involves introducing a harmless odorous or irritating test agent into your breathing zone. If you do not detect the test agent, the respirator fits you properly. A quantitative fit-test (QNFT) is a more sophisticated and accurate type of fit-test done with a machine. It measures the actual amount of leakage into the respirator while you are wearing it, which gives you a “fit factor” for the respirator.
8. A respirator must be adjusted when you put it on to ensure the best possible seal. This is called a user seal check, and you must do it every time you put on your respirator. A *positive-pressure user seal check* includes covering the exhalation valve of the respirator with your palm, and exhaling gently for about 10 seconds. If your respirator seals properly, a slight pressure should build up inside your face-piece. If you feel or hear air leaking out, the respirator is not sealing properly. You must tighten your face-piece straps slightly and repeat the user seal check. A *negative-pressure user seal check* includes covering the filters or cartridges with the palms of your hands, and inhaling gently and holding your breath for about 10 seconds. If your respirator seals correctly, your face-piece should collapse slightly inward. If the respirator does not seal correctly, the face-piece will not collapse, and you will feel air leaking into the face-piece.
9. During a respirator inspection, the following should be checked:
 - Respirator function;
 - Connections, including tightness; and
 - Condition of all parts, especially rubber parts, for flexibility and deterioration.
10. Your employer is required to create and put in place procedures for the proper use of respirators. A fit-test must be performed before you are assigned a respirator to ensure that the respirator fits properly and affords you the required protection. User seal checks are done every time you put a respirator on to make sure it is adjusted properly and that you have a good face-piece seal. Your respirator should be packed and stored to prevent the face-piece and any other parts from chemicals, contamination, damage, dust, moisture, extreme temperatures, and sunlight.
11. Selection of PPE should always be based on risk assessment. The level of protection needed for a work environment can be grouped into two categories:
 - **High-Risk Protection:** Needed if there is a potential for exposure to blood and bodily fluids.
 - **Low-Risk Protection:** Needed if exposure does not include blood and bodily fluids. If this is the case, there is still a need for PPE and decontamination, but it is not as extensive as for bodily fluid exposures.

PPE for high-risk environments includes gloves (inner and outer), gowns and protective suits, head covers, foot protection, respirators, and plastic aprons. PPE for low-risk environments includes gloves (inner only), gowns, foot protection, face shield, respirators, and plastic aprons. Training with the PPE being used is crucial in order to maximize the protection it provides. The CDC recommends administrative procedures to document the training of observers and healthcare workers for proficiency and competency in donning and doffing PPE, and in performing all necessary care-related duties while wearing PPE.

Chapter 5: Personal Protective Equipment

Chapter 5: Things to Remember (continued)



Chapter 5: Personal Protective Equipment

Things to Remember

12. There are many steps involved in the proper inspection, donning, and doffing of PPE. These steps may differ from site to site. Donning uses a trained observer and doffing uses a trained observer's assistant. Checklists insure that each stage is done properly.
13. The CDC guidelines for healthcare include disinfecting immediately any visibly contaminated PPE surfaces. Decontamination is critical because workers can become contaminated with infectious material while taking off PPE and respirators. Disposable PPE, such as protective gowns or suits, should be put into leak-proof disposable infectious waste containers. Containers should have leak-proof labeled biohazard bags that conform to DOT Hazardous Materials Regulations (HMR) specifications.
14. The CDC has a standard protocol for safe doffing of inner gloves. The protocol helps to reduce contamination to the worker in the doffing process.

