

Levels of Protection

The combination of respiratory and Chemical Protective Clothing (CPC) is described as Levels of Protection - A, B or C. Level D is work clothes; these provide no respiratory protection and minimal skin protection although optional Personal Protective Equipment (PPE) can be added.

Each level is described in this exercise, and examples given of when each is appropriate to use.

OSHA (Occupational Safety and Health Administration) standards for protection for workers potentially exposed to hazardous materials (29CFR1910.120 Appendix B) can be found here:

<https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.120AppB>

Objectives

When completed, you will better be able to:

- Identify the Level of PPE needed

Levels of PPE

Level A

Level A is the highest level of protection which can be worn.

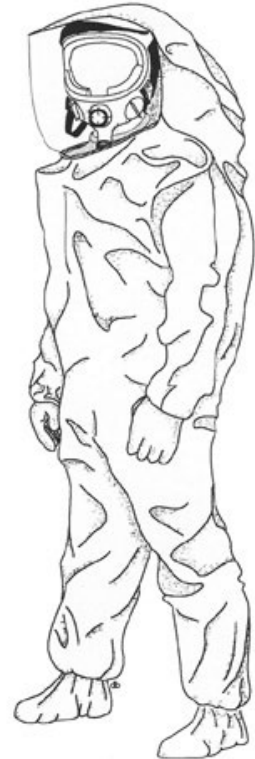
What Is Level A Protection?

The following list constitutes Level A equipment; it may be used as appropriate:

- Positive-pressure, pressure-demand, full-facepiece SCBA or positive-pressure, supplied-air to full-face piece with escape SCBA (NIOSH-approved)
- Totally encapsulating chemical-protective suit (TECP) (gas tight or vapor tight)
- Inner and outer chemical-resistant gloves
- Disposable protective suit, gloves, and boots (depending on suit construction, may be worn over totally encapsulating suit)
- Coveralls*
- Long underwear*
- Hard hat (under suit)*
- Chemical-resistant boots with steel toe and shank
- Cooling system (ice vest, water/air circulation)*

*Optional as applicable

Note: Suit must be properly equipped with a pass-through air-line connection, referred to as an air-line egress if using a Supplied Air Respirator (SAR).



When Is Level A Protection Needed?

Level A protection is required when:

- The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and respiratory system.
- There is potential for splash, immersion, or exposure to vapors, particulates, or gases that are harmful to the skin or may be absorbed through the skin.
- Confined-space entry may be involved and the need for Level A cannot be ruled out (but explosion hazard has been ruled out).
- The skin absorption hazard may likely result in immediate death or serious illness/injury or impair the ability to escape.

Level B

Level B is used when maximum respiratory protection is desired, but the skin/eye hazards do not require Level A.

What Is Level B Protection?

The following constitutes Level B equipment; it may be used as appropriate.

- Positive-pressure, full-facepiece SCBA or positive-pressure, pressure-demand, supplied-air to full-face piece with escape SCBA (NIOSH approved)
- Hooded chemical-resistant clothing **OR** total encapsulating chemical suit (not gas tight or vapor tight)
- Inner and outer chemical-resistant gloves
- Outer chemical-resistant boots with steel toe and shank
- Boot covers: outer, chemical-resistant (disposable)*
- Hard hat*
- Face shield*
- Cooling system (ice vest, water/air circulation)*
- Coveralls*

*Optional as applicable

New Level B chemical-resistant clothing is designed to go over the SCBA. If appropriate for the potential exposures, this CPC should be used to protect the SCBA and prevent its contamination. In this case, the Level B ensemble will resemble a Level A ensemble, but the suit is not vapor-tight.

When Is Level B Protection Needed?

Level B protection is required when:

- The highest level of respiratory protection is needed but a lower level of skin protection is acceptable
- The substances have been identified
- An SCBA is required
- Less skin protection is needed. (Vapor and gases are not believed to be present at high levels harmful to skin or capable of being absorbed through intact skin.)



Level C

Level C provides less skin and respiratory protection than Level A or B.

What Is Level C Protection?

The following list constitutes Level C equipment; it may be used as appropriate.

- A full-face or half-face air-purifying respirator (NIOSH-approved)
- Hooded chemical-resistant clothing
- Inner and outer chemical-resistant gloves
- Coveralls*
- Boots (outer), chemical-resistant steel toe and shank*
- Boot covers: outer, chemical-resistant (disposable)*
- Hard hat*
- Escape mask*
- Face shield*

*Optional as applicable

When Is Level C Protection Needed?

Level C provides protection when:

- The concentration(s) and type(s) of airborne substance(s) are known and the criteria for using an air-purifying respirator are met.
- Direct contact with the hazardous substance will not harm the skin or the substance will not be absorbed through any exposed skin.
- Air contaminants have been identified, concentrations measured, and an air-purifying respirator is available with an acceptable protection factor
- An adequate level of oxygen ($\geq 19.5\%$) is available and all other criteria for the safe use of air-purifying respirators are met.



Level D

This level offers no respiratory protection and low skin protection.

What Is Level D Protection?

The following list constitutes Level D equipment; it may be used as appropriate.

- Coveralls (work uniform)
- Chemical-resistant boots or shoes with steel toe and shank
- Hard hat*
- Gloves*
- Outer, chemical-resistant boots (disposable)*
- Safety glasses or chemical splash goggles*
- Escape mask*
- Face shield*

*Optional as applicable

When Is Level D Protection Needed?

Level D is required when:

- Minimal protection from chemical exposure is needed. It is worn to prevent nuisance contamination only.
- The atmosphere contains no known hazards.
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Typical Uses of Level D

Level D protection is worn by personnel who may be exposed only to nuisance contamination while working with hazardous materials. Typically, workers involved with support activities such as equipment supply, maintenance, off-site vehicle operation, or supervision/management will wear Level D.

Level D may appear similar to typical work clothes. Differences include the chemical-resistant boots with steel shank.

Summary

Remembering Levels of Protection

A helpful way to remember the levels of protection is:

Level A - **A**ll Covered, gas/mist tight

Level B - **B**reathing Air, splash protection

Level C - **C**artridge Respirator or air purifying respirator

Level D - **D**on't Expect Protection", regular work clothes

A general rule for which level of protection to use is: The less you know, the higher you go.

Exercise – PPE Selection

The facilitator will provide several descriptions of work that might require one of the levels of exposure shown above. Working in groups, identify needed level of protection for each of the scenarios and be prepared to discuss your results during a report back.

Closing

For each scenario, did you identify the Level of PPE needed?

Based on this exercise, what takeaways do you have as you go back to work?

Please ask any remaining questions.