

**UCDAVIS**

**SAFETY SERVICES**

*Environmental Health and Safety*

<http://safetyservices.ucdavis.edu>

**Workplace  
PPE Selection Guide**

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This document is intended as a supplement to the Hazard Assessment Tools in the selection of appropriate personal protective equipment (PPE). PPE selection should be based on risk assessments, which includes evaluation of hazards and applicable procedures and work practices, in consultation with area supervision and campus EH&S personnel as needed. This PPE Selection Guide is not intended to be a comprehensive resource on PPE.

**PPE Categories**

[Fall Protection](#)

[Hearing Protection](#)

[Foot Protection](#)

[Respiratory Protection](#)

[Hand Protection](#)






[Skin & Body Protection](#)






[Head Protection](#)




[Vision and Face Protection](#)

## Skin & Body Protection

Laboratory coats, scrubs, uniforms, and disposable body coverings provide a level of protection from splash hazards. Special hazards and material qualities such as flame resistance, specific chemical resistance, physical strength (e.g., leather) and visibility should be considered when selecting PPE for skin and body protection.






PPE	Specific Type (example)	Characteristics	Applications
<b>Disposable sleeves</b>		Disposable clothing and skin protection, protection from particulates	Working with particulates or potent compounds
<b>Disposable Gowns</b>		Clothing and skin protection, manufactured from variety of materials depending upon needed application	Working with Biohazards and animals
<b>Scrubs</b>		Provides a layer of protection for the skin and/or clothing from contact with biological and chemical fluids	Working in clinical, medical and surgical settings as needed
<b>Tyvek Gown/Coveralls</b>		Clothing and skin protection, tear resistant, protection from particulates	Working with biohazards, chemicals, animals or airborne particulates
<b>Safety (Visibility) Vest</b>		Colorful and/or reflective	Construction sites, traffic hazard areas, emergency response






PPE	Specific Type (example)	Characteristics	Applications
<p><b>Lab Coats (Knee Length)</b></p>	<p><b>Cotton</b></p> 	<p>Protects skin and clothing from dirt, inks, non-hazardous chemicals, biohazards without aerosol exposure</p>	<p>General use; Chemical, Biological, Radiation, Physical and Animal Hazards</p>
	<p><b>Barrier</b></p> 	<p>Does not permit blood or other potentially infectious materials to pass through due to 3-layer construction</p>	<p>Working with human blood, body fluids, tissues, cells or other potentially infectious material which may contain human bloodborne pathogens</p>
	<p><b>Flame Resistant(FR)</b></p> 	<p>Flame resistant (e.g. Nomex or flame-resistant cotton)</p>	<p>Working with water or air reactive chemicals, flammable solvents, potentially explosive chemicals</p>
<p><b>Flame Resistant Coveralls</b></p>		<p>Flame resistant (e.g. Nomex or flame-resistant cotton)</p>	<p>Working with water or air reactive chemicals, flammable solvents, potentially explosive chemicals, welding, or electrical systems</p>
<p><b>Leather Apron, Jacket, Coveralls and Sleeves</b></p>		<p>Leather clothing</p>	<p>Welding or other shop work with potential sparks or projectiles</p>





PPE	Specific Type (example)	Characteristics	Applications
<b>Aprons</b>	<p><b>Flame Resistant (FR) Apron</b></p> 	<p>Flame resistant (e.g. Nomex or flame-resistant Cotton)</p>	<p>Working with flammable solvents, welding or electrical systems.</p>
	<p><b>Rubber-coated wash apron</b></p> 	<p>Chemical splash protection, good abrasion resistance</p>	<p>Working with apparatus under pressure, splash potential of hazardous liquids</p>
	<p><b>Neoprene apron and sleeves</b></p> 	<p>Chemical resistant, tear resistant; splash protection</p>	<p>Working with apparatus under pressure, splash potential of hazardous liquids</p>

## Hand Protection

Gloves should be selected for each procedure to provide protection from the hazards. In some circumstances there may be several hazards and glove selection may involve different gloves for different steps of the procedure and/or several layers of gloves may be needed to address all hazards. For example, when injecting radioactive materials into a research animal one may need a layer of disposable gloves for protection from the radioactive liquid augmented with a metal mesh glove for protection from animal bites.

PPE	Specific Type (example)	Characteristics	Applications
Disposable Gloves, thin-gauge* (< 8 – 10 mils)	<b>Disposable latex gloves</b> 	Powdered or un-powdered, some chemical resistance – consult glove resistance chart, incidental chemical contact only	Working with biological hazards (known or potentially infectious materials including work with animals)
	<b>Disposable vinyl gloves</b> 	Economical and thin	Working with biological hazards, <b>not</b> for chemical handling
	<b>Disposable nitrile gloves</b> 	Some chemical resistance – consult glove resistance chart, incidental chemical contact only	Working with biological hazards and chemical hazards of small quantity
<b>Leather Gloves</b>		Protect and comfort hands from moderate temperatures, sharp objects, damage by friction,	Handling sharp objects and metal, field work, welding
<b>Wire Mesh Gloves</b>		Cut resistant	Working with sharp instruments or live animals




PPE	Specific Type (example)	Characteristics	Applications
<p><b>Chemical Resistant Gloves, multi-use*</b></p>	<p><b>Natural rubber latex</b></p> 	<p>Good resistance to biological or water-based materials, poor organic solvent resistance – consult glove resistance chart</p>	<p>Working with small volumes of aqueous-based low hazard chemicals</p>
	<p><b>Nitrile gloves</b></p> 	<p>Chemical resistant for incidental contact – consult glove resistance chart</p>	<p>Working with larger volumes of chemicals</p>
	<p><b>Butyl gloves</b></p> 	<p>Generally good chemical resistance to many chemicals – consult glove resistance chart</p>	<p>Working with larger volumes of chemicals, hazardous material spills</p>
	<p><b>Viton® II gloves</b></p> 	<p>Generally good chemical resistance to many chemicals, consult glove resistance chart</p>	<p>Working with larger volumes of chemicals, hazardous material spills</p>
	<p><b>Silver Shield gloves</b></p> 	<p>Generally good chemical resistance to many chemicals, consult glove resistance chart, may need overglove for manual dexterity</p>	<p>Working with larger volumes of chemicals, hazardous material spills, good resistance to methylene chloride (dichloromethane)</p>

PPE	Specific Type (example)	Characteristics	Applications
<p><b>Insulated Gloves</b></p>	<p><b>Terrycloth autoclave gloves</b></p> 	<p>Heat resistant</p>	<p>Working with hot equipment</p>
	<p><b>Nomex flight gloves</b></p> 	<p>Heat resistant, possible overglove choice</p>	<p>Some pyrophorics handling, worn as an overglove</p>
	<p><b>Cryogen gloves</b></p> 	<p>Water resistant protection against ultra-cold temperatures</p>	<p>Cryogenics handling</p>
<p><b>Electrical Safety Gloves</b></p>		<p>Insulated voltage-rated rubber, gauntlet length, leather gloves worn over</p>	<p>Electrical safety applications with higher hazard/risk or unknown</p>

\*-Always check the manufacturer’s chemical resistance guides before selecting chemical-resistant gloves. Contact [EH&S](#) for additional information.


## Head Protection

Head protection may be something as simple as a disposable bouffant surgical cap to protect the head from aerosols during surgical operations, or a hard hat to protect from overhead hazards. Electrical work may require arc flash protection of the head, face, hands and body; please consult with your supervisor or EH&S safety staff for guidance.

PPE	Specific Type (example)	Characteristics	Applications
<b>Bouffant Cap</b>		Economical protection for hygienic work environments; protection from dirt, dust	Working with biohazards, surgical applications, animal facilities
<b>Flame Resistant Balaclava</b>		Specialized electrical safety equipment	Electrical safety applications with higher hazard/risk or unknown
<b>Bump Cap</b>		Light-weight plastic cap used to protect against scraping or bumping one's head.	Designed for use in areas with low head clearance. Recommended for areas where protection is needed from head bumps and lacerations. These are not designed to protect against falling or flying objects and are not ANSI approved.




Head Protection continued on following page →



<p><b>Hard Hat</b></p>		<p>Light-weight, metal or reinforced plastic to protect against overhead hazards, incorporates a suspension to dissipate impact from falling objects</p>	<p>Hard hats are divided into three industrial classes:</p> <p><b>Class A</b> hard hats provide impact and penetration resistance along with limited voltage protection (up to 2,200 volts).</p> <p><b>Class B</b> hard hats provide the highest level of protection against electrical hazards, with high-voltage shock and burn protection (up to 20,000 volts). They also provide protection from impact and penetration hazards by flying/falling objects.</p> <p><b>Class C</b> hard hats provide lightweight comfort and impact protection but offer no protection from electrical hazards.</p>
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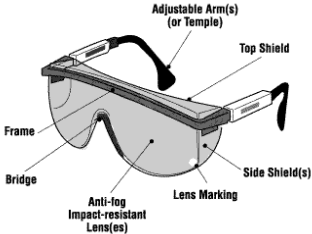




## Hearing Protection





In general, if a workplace noise is loud enough that you could not hold a conversation with a person one arm length away, then a noise assessment must be performed by [EH&S](#) prior to PPE selection. Some exposures may require enrollment in the campus [Hearing Conservation Program](#) managed by [Occupational Health Services](#).

PPE	Specific Type (example)	Characteristics	Applications
<b>Ear Plugs</b>		Disposable, inexpensive	Working with loud equipment, noises, sounds, alarms, etc...
<b>Canal Caps</b>		Inexpensive, easy to insert, not as effective as ear plugs, but easier to insert with soiled hands	Working with loud equipment, noises, sounds, alarms, etc.
<b>Ear Muffs</b>		Reusable, not as effective when worn with safety glasses	Working with loud equipment, noises, sounds, alarms, etc...

## Vision and Face Protection





Safety glasses, safety goggles, laser eyewear, face shields, and helmets provide a level of protection as designated by the manufacturer. The hazard and the protection standards for each piece of vision and face protection PPE must be considered when during selection. The PPE must protect against the posed hazard(s).



PPE	Specific Type (example)	Characteristics	Applications
<p><b>Safety glasses</b></p>		<p>Polycarbonate lens, side shields for eye protection</p> <p>Personnel with corrective lenses will need prescription safety glasses or overglasses</p>	<p>Working with chemical, biological, radiation, physical hazards</p>
<p><b>Goggles</b></p>		<p>Protects eyes from impact, spray, paint, chemicals, flying, chips, dust particles</p>	<p>Working with chemical liquids with likely splash probability or high splash hazard</p>
<p><b>Laser Eyewear</b></p>		<p>Appropriately shaded goggles; optical density based on beam parameters</p>	<p>Working with Class 3 or Class 4 lasers, consult laser use authorization for specific applications.</p>
<p><b>Surgical / Procedure Mask</b></p>		<p>Protects nose and mouth from direct contact with biological and chemical fluids; prevent spread of aerosolized infectious biological agents</p>	<p>Anatomical, surgical, medical and clinical settings</p>
<p><b>Face Shield</b></p>		<p>Impact and chemical resistant face shield, must be combined with safety glasses or goggles</p>	<p>For use with potential chemical splash or projectiles, apparatus under pressure or vacuum, cryogenics handling</p>

PPE	Specific Type (example)	Characteristics	Applications
<b>Optical Face Shield</b>		Face shield with special optical density (OD) value for ultraviolet radiation (UV) or infrared shielding	Working with UV or infrared emitting equipment
<b>Welder's Goggles</b>		Impact resistant lenses and available in graduated shades of light filtration	Welding with potential sparking, scaling, harmful light rays
<b>Welder's Helmet</b>		Durable helmet with filtered lens	Welding to protect eyes and face against heat, sparks, flash burn, ultraviolet or infrared light
<b>Arc-Rated Face Shield</b>		Specialized electrical safety equipment for facial protection	Electrical safety applications with higher hazard/risk or unknown

## Respiratory Protection





In a laboratory, airborne contaminants are kept very low through exhaust ventilation and by working with open containers of volatile materials inside a chemical fume hood. When airborne contaminants cannot be adequately controlled by fume hoods and ventilation, then respiratory protection may be needed. The use of respiratory protection has very stringent regulatory requirements. For this reason, UC Davis has a [Respiratory Protection Program](#) to meet the requirements and provide the necessary training and documentation.

PPE	Specific Type (example)	Characteristics	Applications
<b>Dust Mask</b>		May protect against dusts, fumes, mists, microorganisms including animal allergens	Dusty environments, working with live animals or potentially infectious materials
<b>N95 Respirator</b>		Protects against dusts, fumes, mists, microorganisms including animal allergens	Dusty environments, working with live animals or potentially infectious materials
<b>Cartridge Respirator</b>	<b>Half face Air-Purifying</b> 	Protects against variety of particulates, vapors, dust, mists, fumes, or a combination of these; depends on filter or cartridge used	Dusty environments, potentially infectious materials, chemical vapors; particulates, and select gases (cartridge dependent)
	<b>Full face, Air-Purifying</b> 	Similar to half-face, but with greater protection factor, and greater protection of eyes and face; depends on filter or cartridge used	Dusty environments, potentially infectious materials, chemical vapors; particulates, and select gases (cartridge dependent)

PPE	Specific Type (example)	Characteristics	Applications
<p><b>Powered Air-Purifying Respirator (PAPR)</b></p>		<p>Powered air purifying respirator; delivers steady supply of filtered air with loose fitting hood; can be used with HEPA filters or chemical cartridges.</p>	<p>Working in some BSL – 3 environments; high levels of chemical vapors, particulates;</p>
<p><b>Self-Contained Breathing Apparatus (SCBA)</b></p>		<p>Bulky, limited operation time, highly protective. (Mostly used by UCD Fire Department)</p>	<p>Used in oxygen deficient atmospheres, Immediately Dangerous to Life or Health (IDLH) or areas of high concentrations or unknown airborne contaminants.</p>






## Foot Protection

Foot protection may be something as simple as a disposable shoe covers to minimize spread of contamination. In food service and vivariums, slip resistant shoes may reduce the risk of slips, trips, and falls. In shops and industrial activities, the supervisor must evaluate the hazards and select foot protection accordingly.

PPE	Specific Type (example)	Characteristics	Applications
<p><b>Shoe Cover</b></p>		<p>Protection from dirt, dust; maintenance of hygienic work environments.            Non-slip soles</p>	<p>Working with biohazards, animal facilities, or potential floor contaminants</p>
<p><b>Foot/Shin Guards</b></p>		<p>Typically strap on to legs or feet.</p>	<p>Use of high-pressure washers, or protection of shins and feet when handling heavy materials.</p>
<p><b>Slip Resistant Shoes</b></p>		<p>Shoe with sole designed to enhance traction in slippery work environments</p>	<p>Working in animal facilities, custodial applications, food service facilities, medical/clinical settings, and shops</p>
<p><b>Safety Shoes</b></p>		<p>Toe, metatarsal, foot protection, steel reinforcements and inserts.            There are numerous types of safety shoes for specific applications.</p>	<p>Handling heavy items, construction, warehouse applications, agricultural field work</p>

## Fall Protection

A fall protection system is needed where there is a potential for injury due to falling while working at elevated height. Consult with EH&S prior to procurement of any items for a fall protection system. Fall protection regulations are contained in both General Industry Standards and Construction Standards. Proper training and inspection of equipment is required under these regulations. Consult EH&S for additional information.

PPE	Specific Type (example)	Characteristics	Applications
<b>Full Body Harness</b>		Provides protection from injury while falling from heights	Working at heights (> 6 feet) and confined space retrieval
<b>Locking Carabiner</b>		Connect components of a fall protection system	Working at heights (> 6 feet) and confined space retrieval
<b>Shock Absorbing Lanyard</b>		Provides connection from harness to anchor point with ability to lessen fall force factor, working length of 6 feet	Working at heights (> 18.5 feet of fall clearance) for fall arrest situations
<b>Self-Retracting Lifeline w/Swivel</b>		Provides connection from harness to anchor, shorter activation distance reduces fall force factor	Working at heights movement for fall arrest situations where greater worker movement flexibility is needed
<b>Anchor</b>		Primary point of attachment for a fall protection system, minimum 5,000 pound breaking strength	Working at heights (> 6 feet) and confined space retrieval