LABORATORY COAT SELECTION AND USE GUIDANCE DOCUMENT

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A. PURPOSE

Lab coats ensure that your personal clothing and body are protected against contaminants and potential workplace accidents. Always wear your lab coat in the workplace to avoid tracking contaminants home and prevent bodily harm. Never underestimate the potential for laboratory hazards, regardless of how safe the workplace activities may seem.

All University of California, Riverside (UCR) students, faculty, staff, and affiliates (collectively, "UCR personnel") are required to wear lab coats when:

(i) Working with hazardous materials, including but not limited to, infectious materials, radioactive materials, chemicals, physical hazards (e.g., potential for flying objects/debris), and harmful temperature extremes; and,

(ii) Working within a Laboratory/Technical Area, defined by the University of California – Office of the President (UCOP) PPE Policy as "*a location where the use or storage of hazardous materials occurs or where equipment may present a physical or chemical hazard*". The use of lab coats should be appropriately selected on the basis of the present hazard(s).

The Laboratory Coat Selection and Use Guidance Document (the "Guidance Document") is intended to provide instructions and information on determining when lab coats are required, lab coat considerations and limitations, selecting appropriate lab coat based on present hazards, and care, use, and disposal.

B. DETERMINING WHEN LAB COATS ARE REQUIRED

The Principal Investigator (PI)/Supervisor is required to assess hazards in the laboratory or research setting using the UCR Laboratory Hazard Assessment Tool (LHAT). The LHAT's objectives are to determine if PPE is necessary and provide UCR personnel with guidance to select the appropriate PPE, including lab coats. The LHAT is UCR's primary and recommended workplace hazard assessment process.

In addition to the LHAT, UCR personnel must also be aware of the present workplace hazards. As detailed in Section A of the Guidance Document, lab coats must be worn when working with hazardous materials or occupying a Laboratory/Technical Area; examples of these criteria requiring lab coats include:

Examples of Laboratory/Technical Areas

- Research Settings/Laboratories
- Teaching Settings/Laboratories
- QA/QC and Analytical Laboratories
- Stock/Storage Rooms
- Waste Accumulation Areas/Locations
- Cold Rooms
- Machine Shops/Workshops
- Vivaria
- Visual/Performing Arts Studios and Shops

Examples of Workplace Hazards/Associated Activities

- Chemicals (solids/liquids/vapors/mists/sprays)
- Biological Agents (blood/bacteria/viruses/fungi)
- Dusts/Particles/Chips/Sand/Dirt
- Torching/Welding/Soldering/Molten Metals/Sparks
- Abrasive Blasting/Machining
- Light Radiation (bright lights, ultraviolet, laser, welding)
- Chopping/Chipping/Cutting/Drilling/Grinding
- Hammering/Milling/Sanding/Sawing
- Temperature Extremes (liquid nitrogen, sparks)

If lab coats are required, follow the instructions outlined on the UCR Environmental Health & Safety (EH&S) Personal Protective Equipment (PPE) webpage to obtain either flame resistant or traditional lab coats at no charge. UCR EH&S will ensure that the issued lab coats are properly fitted to the individual and replace any damaged lab coats. Specialized lab coats (e.g., barrier lab coats, chemical-resistant aprons) must be provided by the workplace's PI/Supervisor.

C. LAB COAT CONSIDERATIONS AND LIMITATIONS

No single lab coat is protective against all hazards – different types of lab coats provide different types of protection:

Traditional lab coats are intended to protect against incidental splashes of hazardous materials.

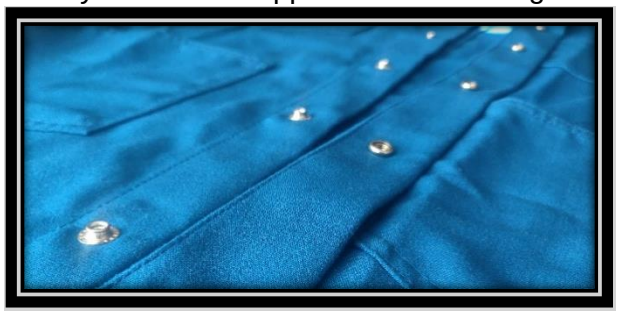
Flame resistant lab coats are intended to protect the user when there is a risk of catching personal garments or skin on fire; flame resistant – not fire-proof.

Must be worn when (i) working with any amount of pyrophoric materials, (ii) working with flammable liquids near potential ignition sources, or (iii) determined by the LHAT.

Barrier lab coats (pinstriped) are intended to protect the user when there is a risk of splash from blood-borne pathogens or other biohazardous materials.

Shorts or open-toed shoes must never be worn in a Laboratory/Technical Area or when working with or near hazardous materials, even under a lab coat. Full-length pants (or equivalent) and closed-toe/heel shoes must be worn for safety and compliance with the UCOP PPE Policy.

When wearing lab coats, ensure that the coats are fully buttoned/snapped to their full length.



Lab coat sleeves must be of a sufficient length to prevent direct skin exposure while wearing gloves.

D. SELECTING APPROPRIATE LAB COAT BASED ON PRESENT HAZARDS

The below table, extracted from the University of California – Office of the President (UCOP) PPE Policy summarizes the appropriate PPE (including lab coats) to be worn based on the UCR workplace activity. Reference your LHAT for specific information on your workplace's present hazard(s) and recommended PPE.

Chemical Hazards					
Activity in Lab	**Potential Hazard**	**Recommended Lab Coat Type**			**Additional PPE**
		Flame Resistant (NFPA 2112)	**Traditional**	**Barrier**	
C01. Working with small volumes of corrosive (e.g. acids, caustics, etc.) liquids or solids.	Eye or skin damage. Low probability for a splash hazard.		✓		✓ Safety glasses ✓ Chemical-resistant gloves
C02. Working with corrosive or acutely toxic liquids or other materials which creates a splash hazard.	Poisoning, increased potential for eye and skin damage.		✓		✓ Chemical-resistant apron ✓ Safety goggles ✓ Chemical-resistant gloves
C03. Working with small volumes of flammable solvents/materials when no reasonable ignition sources are present.	Skin or eye damage, potential poisoning through skin contact.		✓		✓ Safety glasses ✓ Chemical-resistant gloves
C04. Working with flammable materials (including solvents): When using a large quantity; or, any quantity when there is a risk of ignition; or, areas where flammable vapors or gas are may be present.	Major Fire. Major skin or eye damage, potential poisoning through skin contact.	✓			✓ Safety glasses ✓ Flame-Resistant (FR) outer gloves ✓ Chemical-resistant inner gloves
C05. Working with toxic or hazardous chemicals (solid, liquid, or gas). (including but not limited to GHS H301, H302, H311, H312, H331 H332)	Skin or eye damage, potential poisoning through skin contact.		✓		✓ Safety glasses (chemical splash goggles for large quantities) ✓ Chemical-resistant gloves
C06. Working with Acutely Toxic Chemicals. (GHS H300, H310, H330)	Spills, splashes, ingestion, inhalation, absorption. Chemicals pose a high level of immediate health risk.		✓		✓ Chemical protection apron ✓ Safety glasses ✓ Chemical resistant gloves

C07. Working with an apparatus with contents under pressure or vacuum.	Eye or skin damage.		✓		✓ Chemical-resistant apron (for high risk activities) ✓ Safety glasses ✓ Face shield (for high risk activities) ✓ Chemical-resistant gloves
C08. Working with pyrophoric (air reactive) chemicals or chemicals that in contact with water releases flammable gasses (water reactive). (GHS H25x and H26x)	Severe skin and eye damage. Fire.	✓			✓ Safety glasses ✓ Face shield ✓ FR rated outer gloves ✓ Chemical-resistant inner gloves
C09. Working with potentially explosive chemicals. (e.g. Nitrates, Perchlorates, Azides, Nitrites etc.)	Splash, detonation, flying debris, skin and eye damage, fire.	✓			✓ Safety glasses ✓ Face shield, and/or use blast shield ✓ Chemical-resistant gloves
C10. Minor chemical spill cleanup	Skin or eye damage, respiratory damage.		✓		✓ Safety glasses ✓ Chemical-resistant gloves ✓ Shoe covers ✓ Chemical-resistant apron
C11. Major chemical spill cleanup	Multiple hazards.	Call EH&S for assistance			
C12. Working with known or suspect human carcinogens (GHS H350, H351)	Spills, splashes, ingestion, inhalation, absorption. High hazard cancer-causing agents.		✓		✓ Safety glasses ✓ Chemical-resistant gloves
C13. Working with reproductive hazards (GHS H340, H341, H360, H361)	Spills, splashes, ingestion, inhalation, absorption. Agents that affect reproductive capabilities, cause mutation and adversely affect fetal development.		✓		✓ Safety glasses ✓ Chemical-resistant gloves
C14. Working with engineered nanomaterials.	Inhalation, exposure, dermal exposure.		✓		✓ Chemical Splash goggles ✓ Chemical-resistant gloves

Physical Hazards					
Activity in Lab	**Potential Hazard**	**Recommended Lab Coat Type**			**Additional PPE**
		Flame Resistant (NFPA 2112)	**Traditional**	**Barrier**	
P01. Working with cryogenic liquids.	Major skin, tissue, or eye damage.		✓		✓ Safety glasses (goggles for large volumes) ✓ Face shield ✓ Cryogenic protective gloves
P02. Removing freezer vials from liquid nitrogen.	Vials may explode upon rapid warming. Cuts to face/neck and frostbite to hands.		✓		✓ Safety glasses ✓ Face shield ✓ Cryogenic protective gloves
P03. Working with very cold equipment or dry ice.	Frostbite, hypothermia.		✓		✓ Safety glasses ✓ Cryogenic protective gloves
P04. Working with scalding liquids or hot equipment (e.g. autoclave, water bath, oil bath).	Burns resulting in skin or eye damage.		✓		✓ Safety glasses (goggles for large volumes) ✓ Thermal protective gloves (impermeable insulated gloves for liquids and steam)
P05. Glassware washing.	Lacerations, chemical splash.		✓		✓ Safety glasses ✓ Heavy rubber gloves

P06. Working with loud equipment, noises, sounds, alarms, etc.	Potential ear damage and hearing loss.	Earplugs or ear muffs as necessary			
P07. Working with a centrifuge.	Imbalanced rotor can lead to broken vials, cuts, exposure.				✓ Safety glasses ✓ Disposable gloves
P08. Working with a sonicator.	Ear damage, exposure.		✓		✓ Safety glasses ✓ Disposable gloves ✓ Earplugs or ear muffs as necessary
P09. Working with sharps (e.g. needles and razor blades.)	Cuts, exposure.		✓		✓ Safety glasses ✓ Cut resistance gloves

Biological Hazards ☐ I have a BUA that addresses all of these items. Skip to next section.					
Activity in lab	**Potential Hazard**	**Recommended Lab Coat Type**			**Additional PPE**
		Flame Resistant (NFPA 2112)	**Traditional**	**Barrier**	
B01. Working with human or nonhuman primate blood, body fluids, tissues, cells or other potentially infectious material (OPIM) which may contain human blood borne pathogens (BBP).	Exposure to infectious materials and sharps injuries.			✓ (Disposable)	✓ Eye and mucous membrane protection (as appropriate for operations) ✓ Disposable gloves
B02. Working with microbial agents (bacteria, virus, parasites, yeast, fungi, prions), recombinant DNA and/ or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 1 microbial agents or recombinant DNA. (BSL-1)	Eye irritation, sharps injury. Exposure of infectious material to those who may have personal health issues which make them more susceptible to infection; cross contamination of animal or extra laboratory areas.		✓		✓ Safety glasses ✓ Disposable gloves
B03. Working with microbial agents, recombinant DNA and/or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 2 microbial agents or recombinant DNA. (BSL-2)	Exposure to infectious material, particularly through broken skin or mucous membranes, sharps injuries.		✓		✓ Safety glasses ✓ Double layer of disposable gloves
B04. Working microbial agents, recombinant DNA and/or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 2 microbial agents or recombinant DNA for which Biosafety Level 3 practices are required. (BSL-2+)	Exposure to infectious materials with high risk of exposure by contact with skin or mucous membranes and/ other potential or unknown routs of entry and or increased consequences of exposure. Sharps injuries.		✓		✓ Safety glasses ✓ Double layer disposable gloves

B05. Working with microbial agents, recombinant DNA and/or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 3 microbial agents or recombinant DNA. (BSL-3)	Exposure to infectious materials with high risk of exposure, particularly through the inhalation route.	Full back closing disposable gown or coveralls (preferred)			✓ Safety glasses ✓ Double layer disposable gloves ✓ Shoe cover or dedicated shoe Full back closing disposable gown or coveralls (preferred)
B06. Working with live animals- alone or in conjunction with Risk Group 1 microbial agents or recombinant DNA. (ASBL-1)	Animal bites, allergies, eye irritation, sharps injury. Exposure of infectious material to those who may have personal health issues which make them more susceptible to infection; cross contamination of animal or extra laboratory areas.		✓		✓ Safety glasses ✓ Disposable gloves Additional PPE (e.g. puncture resistant gloves) may be required based on risk assessment by the IBC & IACUC. Additional gowning (shoe covers, face mask) may be required for animal welfare purposes.
B07. Working infected or potentially infectious live animals—alone or in conjunction with Risk Group 2 microbial agents or recombinant DNA (or materials exposed to RG-2 agents). (ABSL-2)	Animal bites, exposure to infectious material, allergies, sharps injury.		✓		✓ Safety glasses ✓ Disposable gloves ✓ Bouffant Additional PPE (e.g. puncture resistant gloves) may be required based on risk assessment by the IBC & IACUC. Additional gowning (shoe covers, face mask) may be required for animal welfare purposes.

Non-Ionizing Radiation Hazards

Activity in lab	Potential Hazard	Recommended Lab Coat Type			Additional PPE
		Flame Resistant (NFPA 2112)	Traditional	Barrier	
N01. Working with ultraviolet radiation.	Conjunctivitis, corneal damage, skin redness.		✓		✓ UV face-shield with correct OD value ✓ Opaque gloves
N02. Working with infrared emitting equipment (e.g. glass blowing).	Cataracts, burns to cornea.		✓		✓ Appropriate shaded glasses

Radiological Hazards ☐ I have a RUA and/or MUA that addresses all these. Skip to next section.					
Activity in lab	**Potential Hazard**	**Recommended Lab Coat Type**			**Additional PPE**
		Flame Resistant (NFPA 2112)	**Traditional**	**Barrier**	
R01. Working with unsealed radioactive materials including generally licensed radioactive material or devices (e.g., uranyl acetate, uranyl nitrate, thorium, nitrate).	Cell damage, potential spread of radioactive materials.		✓		✓ Safety glasses ✓ Impermeable gloves or chemical resistant gloves
R02. Working with unsealed radioactive materials in hazardous chemicals (corrosives, flammables, liquids, powders, etc.).	Cell damage or spread of contamination plus hazards for the specific chemical.		✓		✓ Safety glasses (goggles for splash hazard) ✓ Chemical-resistant gloves
R03. Working with radioactive sealed sources or devices containing sources of radioactive materials (e.g., liquid scintillation counters, gas chromatographs/electron capture detectors, static eliminators, etc.)	If sealed source is compromised due to removal from equipment or physical abuse: cell damage, potential spread of radioactive materials.	PPE is not necessary under normal operating instructions. *Note: Source may not be removed form device except by EH&S or manufacturer.*			

Laser Hazards					
Activity in lab	**Potential Hazard**	**Recommended Lab Coat Type**			**Additional PPE**
		Flame Resistant (NFPA 2112)	**Traditional**	**Barrier**	
L01. Open Beam- Performing alignment, trouble-shooting or maintenance that requires working with an open beam and/or defeating the interlock (s) on any Class 3 or Class 4 laser system.	Eye damage	Consider appropriate skin-covering clothing (e.g., tightly-woven fabrics). For Class 4 lasers, flame-retardant clothing is recommended.			✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.
L02. Open Beam- Viewing a Class 3R laser beam with magnifying optics.	Eye damage	N/A	N/A	N/A	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.
L03. Open Beam- Working with a Class 3B laser open beam system with the potential for producing direct or specular reflections.	Eye damage	N/A	N/A	N/A	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.
L04. Open Beam- Working with a Class 4 laser open beam system with the potential for producing direct, specular or diffuse reflections.	Eye damage, skin damage	Appropriate skin protection			✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.
L05. Non-Beam - Handling dye laser materials, such as powdered dyes, chemicals, and solvents.	Cancer, explosion, fire.	✓			✓ Gloves ✓ safety glasses
L06. Non-Beam- Maintaining and repairing power sources for large Class 3B and Class 4 laser.	Electrocution, explosion fire	✓			✓ Electrical isolation mat
L07. Enclosed Beam- Using a Class 1 device housing a Class 3B or Class 4 enclosed or embedded laser with the potential for beam exposure during a Service Event.	Eye damage, skin damage	Appropriate skin protection			✓ Appropriate protective eyewear, wave length and optical density based on individual beam parameters

E. CARE, USE, AND DISPOSAL

Lab coats should never be taken outside of the laboratory or research setting, as contaminants can be tracked to public settings or private residences. Additionally, lab coats should only be laundered at specialized facilities, i.e., lab coats should not be washed in standard residential or commercial laundry machines. Visit the UCR Lab Coat Laundering webpage for lab coat laundering instructions.

UCR personnel are responsible for periodically inspecting their PPE (including lab coats) for any damage that may compromise the PPE's protective integrity. The PI/Supervisor should be informed of damaged PPE. UCR EH&S will replace damaged or heavily soiled lab coats at no charge. To replace damaged or heavily soiled lab coats, follow the instructions outlined on the UCR EH&S PPE webpage.

The PI/Supervisor is responsible for the proper disposal of damaged and heavily-soiled lab coats. Any protective clothing that becomes contaminated with hazardous materials must be decontaminated or appropriately discarded based on the contamination category (e.g., biological, chemical). For good-condition lab coats that are no longer used, contact ehslaboratory@ucr.edu for EH&S drop-off instructions.