

# Area-Based Personal Protective Equipment (PPE) Requirements

These are the minimum acceptable personal protective equipment (PPE) requirement for pre-determined areas. Additional PPE may be used by organizations without SBMS PPE and Respirators Subject Matter Expert (SME) approval. Lessening these requirements requires concurrence of the SME on the Area-Based PPE Certification form. Other types of areas may require Area-Based PPE as determined by the PPE and Respirators SME.

## 1. Area-Based PPE Requirements

Minimum PPE Requirements for an area, unless determined on a case-by-case basis by SME <sup>1,2,7</sup>						
Area	Predominant Hazard	Long pants <sup>3</sup>	Lab coat <sup>4</sup>	Fully Enclosed Shoes	Safety Toe Shoes <sup>5</sup>	Safety Glasses <sup>6</sup>
Accelerator Facility	Cuts and abrasions	X	-	X	-	-
Electronics Fabrication Area	Chemical contact (low risk); cuts and abrasions; Small projectiles	X		X		X
Electronics Test Bench Area	Cuts and abrasions	X	-	X	-	-
Machine Shop- Light [Light Technical Shop]	Cuts and abrasions; projectiles; dropped parts	X	-	X	-	X
Machine Shop- Heavy [Heavy Technical Shop]	Cuts and abrasions; projectiles; dropped parts	X	-	-	X	X
Magnet Assembly Area	Cuts and abrasions; projectiles; dropped parts	X	-	-	X	X
Microscope/Optics Area	Dropped parts	X	-	X	-	-
Laboratory- Biological	Biological agent contact	X	X	X	-	X
Laboratory- Chemical	Chemical contact	X	X	X	-	X
Laboratory- Unbound Nanomaterial (UNP)	UNP contact	X	X	X	-	X
Laboratory- Multi-Purpose	Chemical contact (low risk); cuts and abrasions	X	-	X	-	X
Tech Area	Cuts and abrasions; dropped parts	X	-	X	-	-
Warehouse	Cuts and abrasions; dropped parts	X	-	-	X	-

<sup>1</sup> During exhibition/ informational tours with escorted visitors, the area-based PPE requirements can be temporarily suspended for the duration of the tour if operations are stopped and hazards are mitigated. This exemption does not apply to Audits/Surveillances and Tier1 Inspections where tour members may access hazards.

<sup>2</sup> Entry into an area to immediately retrieve and don PPE stored near the entrance is acceptable.

<sup>3</sup> A Long skirt and stockings that covers the lower leg is an acceptable alternative to long pants.

<sup>4</sup> A BNL laundered uniform with long sleeve shirt and long pants may be substituted for a lab coat. Lab coats which have been in contact with Unbound Nanomaterials (UNP) must be disposed of as hazardous waste. They are not to be laundered. Lab coats are not to be worn into offices, lunch rooms, conference rooms, etc. Lab coats should remain in the labs and corridors of science areas.

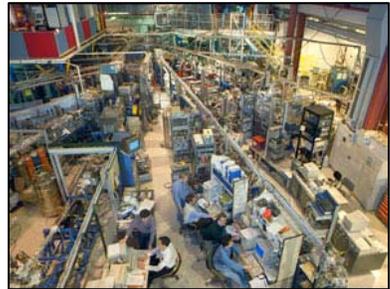
<sup>5</sup> A Composite toe meeting ASTM 2413 Impact Resistance Standard is acceptable alternative to steel- toe.

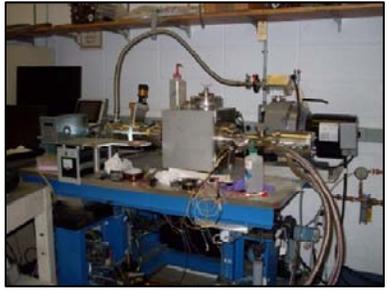
<sup>6</sup> Safety glasses may be removed during operations with eyepieces, such as looking into microscope optics.

<sup>7</sup> An area with no hazards in the Hazard Validation Tool (such as Offices, Lunch Rooms, Conference rooms) does not require Area-based PPE and does not require placarding. A HIP placard is optional at the discretion of the area owner.

## 2. Description of Areas

<p><b>Biological Laboratory:</b> Areas regulated by CDC/NIH biohazard requirements for BSL2 operations involving agents of moderate potential hazard to personnel and the environment [uncharacterized agents or agents known to consistently cause disease in healthy adult humans]</p> <p>Predominant area-based hazards are eye and skin exposure to harmful biological agents and chemicals.</p> <p>PPE required to enter area: long pants; fully enclosed shoes; lab coat; safety glasses.</p>	
<p><b>Chemical Laboratory:</b> An area regulated by OSHA 29CFR1910.1450 Laboratory Standard characterized by many chemical containers and operations such as synthesis, reactions, distillations, separations, purifications, and analysis. Glassware, instrumentation, baths, ovens, furnaces, and similar lab apparatus are used. The chemicals pose an exposure risk based on the hazard, quantities, and types of operations. Areas where OSHA Particularly Hazardous Chemicals (carcinogens, highly acute toxins, and reproductive hazards) are used or stored are also designated as a Chemical Laboratory.</p> <p>Predominant area-based hazards are eye and skin exposure to chemicals.</p> <p>PPE required to enter area: long pants; fully enclosed shoes; lab coat; safety glasses.</p>	
<p><b>Multi-purpose Laboratory:</b> Areas regulated by OSHA 29CFR1910.1450 Laboratory Standard in which more than one type of operations. The use of chemicals poses minimal exposure risk based on the hazard, quantities, and types of operations. Other hazards may include electronic assembly and soldering, small tools, or BSL-1 biohazards (well-characterized non-disease causing agents) and biological growth media preparation. Predominant area-based hazards are eye and skin exposure to hot surfaces and minor exposure to chemicals.</p> <p>PPE required to enter area: long pants; fully enclosed shoes; safety glasses.</p>	
<p><b>Electronics Fabrication Area:</b> No chemicals or only a few chemicals in low volume are used. Electronic components are tested, repaired, assembled. Wire cutting and electronic soldering may be conducted in these areas.</p> <p>Predominant area-based hazards are chemical contact (low risk); cuts and abrasions; small projectiles.</p> <p>PPE required to enter area: long pants; fully enclosed shoes; safety glasses.</p>	

<p><b>Electronics Test Bench Area:</b>  Area has no hazardous chemicals. Electronic components are tested in non-destructive tests such as energizing parts and detecting response. No electronic soldering is conducted in these areas.</p> <p>Predominant area-based hazards are cut and abrasion from metal edges.</p> <p>PPE required to enter area: long pants; fully enclosed shoes.</p>	
<p><b>Microscope/Optics Area:</b>  An area where visible light microscopes, electron microscopes, or other similar equipment is used to view or analyze samples. No chemicals are used in the area and samples are handled in a manner that does not present exposure potential. Viewing into eyepieces may be required which could be hindered by safety glasses.</p> <p>Predominate area-based hazard is minor risk of crush from dropped small parts.</p> <p>PPE required to enter area: long pants; fully enclosed shoes.</p>	
<p><b>Accelerator Facility:</b>  An area with beam lines, hutches, and experimental areas for accelerators. These areas are characterized by incidental use of small amounts of chemicals in procedures that are not part of a production process.</p> <p>Predominant area-based hazard are: cuts and abrasions.</p> <p>PPE required to enter area: long pants; fully enclosed shoes.</p>	
<p><b>Machine Shop-Heavy [Heavy Technical Shop]:</b>  An area where metal, plastic, or wood parts are modified with machines and tools. Stock material may be stored.</p> <p>Parts and stock material of weight, size, or shape to cause serious injury to legs and feet if dropped.</p> <p>Predominant area-based hazards are: cuts and abrasions; projectiles; Risk of crush from dropped parts.</p> <p>PPE required to enter area: long pants; safety toe shoes; safety glasses.</p>	
<p><b>Machine Shop- Light [Light Technical Shop]:</b>  An area where metal, plastic, or wood parts are modified with machines and tools. Stock material may be stored.</p> <p>Parts and stock material is light weight and would only cause minor injury to legs and feet if dropped.</p> <p>Predominant area-based hazards are: cuts and abrasions; projectiles; slight risk of crush from dropped parts.</p> <p>PPE required to enter area: long pants; fully enclosed shoes; safety glasses.</p>	

<p><b>Magnet Assembly Area:</b> An area where large apparatus are manufactured, assembled, and/or tested. Parts and equipment handled of weight, size, or shape to cause serious injury to legs and feet if dropped.</p> <p>Predominant area-based hazards are cuts and abrasions; projectiles; risk of crush from dropped parts.</p> <p>PPE required to enter area: long pants; safety toe shoes; safety glasses.</p>	
<p><b>Tech Area:</b> An area for electrical and mechanical assembly of test apparatus (e.g., detectors and vacuum chambers). Small quantities of solvents are used.</p> <p>Predominant area-based hazards are cuts and abrasions; dropped parts.</p> <p>PPE required to enter area: long pants; fully enclosed shoes.</p>	
<p><b>Warehouse:</b> An area where articles (boxes, parts, supplies) and closed chemical containers are handled using mechanized and manual material handling techniques.</p> <p>Predominant area-based hazards are cuts and abrasions; projectiles; risk of crush from dropped parts.</p> <p>PPE required to enter area: long pants; safety toe shoes.</p>	

### 3. Frequently Asked Questions

Question	Answer
<p>Do the BNL PPE requirements meet Human Performance (HPI) principles?</p>	<p>Yes, the area-based rule approach is derived from the HPI principle that <b>consistent, non-conditional</b> rules are most likely to be understood and implemented. Non-conditional requirements are “rule-based.” Conditional rules with many exceptions are “knowledge –based”. This is the least preferred option because it relies on the experience and knowledge of the users in the full meaning of the exceptions. Inexperienced workers may be prone to errors in judgment.</p>
<p>How do I know what PPE is required for an area?</p>	<p>Areas that require Personal Protective Equipment will be posted with a placard with a pictogram and wording that specify the minimum PPE to enter the area.</p> <p>Other PPE may be required when hazardous operations are occurring in the area.</p>
<p>Which takes priority: area-based requirements or operation-based requirements?</p>	<p>The more stringent requirement is typically operation-based requirements. They are to be observed when work is being done. When work covered by operation-based PPE requirement is over, the area-based rules would then resume. For example, an apron would be required in a lab when handling a strong acid, but the apron would not be required in the same lab when the acid is not in use. The minimum PPE to enter an area will be posted at the entrance.</p>

<p>Who determines the PPE required for an area?</p>	<p>The line organization posts an area with the PPE requirements that are derived from this exhibit or more stringent PPE requirements. The basis for the PPE selected must at a minimum meet the requirements stated in the <i>PPE and Respirators</i> Subject Area and other applicable Subject Areas. Any confusions or unresolved issues are to be referred to the Chemical Hygiene Officer and PPE and Respirator SME.</p> <p>When a lesser level of PPE is to be prescribed because of extenuating circumstances, the lower requirements require the concurrence of the Safety &amp; Health Representative. Document PPE requirements not in agreement with this exhibit in the Work Planning and Control documents and via area postings.</p>
<p>What determines a “Multipurpose Laboratory” versus a “Chemical Laboratory”?</p>	<p>A “Chemical Laboratory” is characterized by frequent use chemicals in operations such as synthesis, reactions, distillations, separations, purifications, and analysis via glassware, instrumentation, baths, ovens, furnaces, etc. This use of chemicals poses high exposure and risk based on the hazard, quantities, and types of operations.</p> <p>The “Multi-purpose Laboratory” has more than one function and the use of chemicals poses minimal exposure and risk based on the hazard, quantities, and types of operations.</p> <p>Your ESH Coordinator, Safety &amp; Health Representative, and Chemical Hygiene Officer will determine the category for any laboratory whose operation is in question.</p>
<p>Do area-based rules apply to me if I am in an area, but not actually doing any hazardous work? <b>Examples:</b> sitting at the counter, writing in a notebook or reading emails on a computer in a chemical lab.</p>	<p>Yes, the area-based rule still apply, for reasons such as:</p> <ul style="list-style-type: none"> <li>• The hazard is still in the area , although your personal risk of exposure is lower;</li> <li>• An accident could occur from the operations by someone else or on-going processes in the area;</li> <li>• Your role might change to active participant in a hazardous operation without you remembering to stop to add the required PPE.</li> </ul>