



## **PPE Choice and Cleaning**

### **PPE for Lab Entry**

#### **Materials:**

NCNC provided cleanroom nitrile gloves, NCNC provided (or ANSI approved) safety glasses, and user provided closed toed shoes.

#### **Incompatible Materials:**

Refer to chemical specific SOPs. NCNC provided cleanroom nitrile gloves are permeated by acetone, most resists, most strippers, some acids and a some bases. NCNC provided safety glasses will permanently fog on contact with Acetone.

#### **Hazards, Exposure Actions and PPE:**

Refer to chemical specific SOPs. When walking through the lab you will face several potentially dangerous but unlikely hazards. Grossly malfunctioning equipment can throw shrapnel, which is primarily hazardous to the eyes. Hazardous chemical residues left on common surfaces can cause rash and severe irritation on hands. Residual chemical droplets on processing benches can drip down, making the feet a vulnerable target. If you suspect your hand has been exposed to chemicals through your gloves, take especial care to wash under your fingernails when washing for 15 min.

#### **Acceptable Locations For Use:**

Standard PPE can be used anywhere and on any equipment in the lab. However, it will not be sufficient for working with most chemicals.

#### **Additional Process Notes:**

ANSI approved safety glasses provide protection from both flying shrapnel and spray solvents (like acetone) which can be very damaging to the eyes. When safety glasses become smudged, feel free to clean them using spray bottle Isopropanol and a Tekwipe. Wipe gently as the tekwipes can scuff most plastics. If you need to see around the safety glasses and conditions are safe, you may temporarily lift the glasses higher on your head. Removing the safety glasses completely often leads to forgetting to replace them. ANSI approved safety glasses or goggles must be worn at all times in the cleanroom, regardless of whether you already wear prescription eyewear. NCNC provides ANSI approved safety glasses, though you can provide your own if desired.

White nitrile cleanroom gloves do not provide appreciable protection to most liquid chemicals, though they will provide protection to many hazardous residues throughout the lab. Keep in mind that your gloves may pick up hazardous residues while working, and avoid touching your face.

## PPE for non-acutely hazardous Organics

### **Materials:**

In addition to Lab entry requirements also wear black, inside-out Butyl/Viton gloves.

### **Incompatible Materials:**

Refer to chemical specific SOPs and/or Ansell's glove choice guide from [www.ansellpro.com](http://www.ansellpro.com). The black Butyl/Viton gloves have very few incompatibles and provide immersion protection against almost all chemicals provided by NCNC. However, some chemicals (aromatics, chlorosolvents, alkanes) will degrade the outer layer.

### **Hazards, Exposure Actions and PPE:**

Refer to chemical specific SOPs. Occasional, small splashes of NCNC's organics will cause relatively little harm, though small consistent (Chronic) exposures can vastly increase your likelihood of poisoning or cancer. Most of our solvents are not acute hazards, but can be potent carcinogens.

### **Acceptable Locations For Use:**

Organics PPE can be used in any chemical bay and should never be used to press buttons on equipment for risk of spreading contaminants. However, if the PPE is clean you can use your knuckles to push buttons.

### **Additional Process Notes:**

Wear the black Ansell Butyl/Viton gloves inside out, and rinse them off after use to keep them clean. These gloves are very expensive, so if you're working messily with photoresist, please wear disposable nitrile gloves over the black Viton/butyls. These gloves have two layers- when you correctly wear them inside out, the outer layer is butyl rubber, and the inner layer is Viton. This gives excellent resistance to most strippers, thinners and resist, as well as splash resistance to most other organics. On the off chance you instead want excellent resistance to aromatics (toluene), chlorosolvents or alkanes, you may flip the gloves right-side-in. However please make sure to thoroughly wash/scrub them, dry them, and flip them back inside out when you're done. These gloves naturally smell lightly of solvents.

Spray bottle solvents and resist spinners can splash and spray solvents which are hazardous to the eyes, so make sure to wear safety glasses or goggles when working with these.

NCNC provided face masks will not protect you from vapors so use solvents in the well-ventilated solvent workstations.

## PPE for acutely hazardous Acids, Bases, Oxidizers and Fluorides

### **Materials:**

In addition to Lab entry requirements also wear blue Nitridex disposable gloves, a chemical apron and a face shield. Goggles are preferred to safety glasses for most applications.

### **Incompatible Materials:**

Refer to chemical specific SOPs and/or Showa's glove choice guide from:

[http://www.newpig.com/wcsstore/NewPigUSCatalogAssetStore/Attachment/documents/ccg/N-DEX PLUS.pdf](http://www.newpig.com/wcsstore/NewPigUSCatalogAssetStore/Attachment/documents/ccg/N-DEX_PLUS.pdf). The blue disposable Nitridex gloves provide immersion protection against most aqueous chemicals provided by NCNC. However, they will only provide splash protection to concentrated (>40%) Sulphuric or Acetic acid (or undiluted cocktails of these chemicals like Piranha). Also, many organics will readily permeate the blue gloves.

### **Hazards, Exposure Actions and PPE:**

Refer to chemical specific SOPs. In general, our acutely hazardous chemicals are hazardous enough to cause painful burns from just a drop, so you should exercise great care even when wearing the appropriate PPE. Your feet will be particularly vulnerable to drops, so you must wear closed toed shoes. If splashed with acutely hazardous chemicals, typically you should remove any contaminated clothing first, use a safety shower for 15 minutes and call 911.

### **Acceptable Locations For Use:**

Acid/Base/Oxidizer/Flouride PPE can be used in any chemical bay, but should never be used to press buttons on equipment for risk of spreading contaminants. However, if the PPE is clean you can use your knuckles to push buttons.

### **Additional Process Notes:**

The blue gloves are disposable- at the end of your work day, just rinse off your gloves and discard them in the normal trash. These gloves can stand several re-uses, but by consistently using new gloves you can help reduce the risk of re-using a holey glove, or tracking someone else's chemical residues around the lab. These gloves give minutes of resistance to most aqueous chemicals, but are only splash resistant to concentrated (>40%) Sulphuric acid and Acetic acid. If you need better resistance, let us know, and we can set you up with an alternative. These gloves are naturally a little tacky.

Vinyl aprons provide excellent protection to most chemicals at NCNC, though you should inspect them for residues before use. Also, if you remove a vinyl apron after wearing it for an extended period, the built-up sweat may make it feel like you've splashed your arms

The face masks are size-adjustable and cleanable with Isopropanol. We stock replacement windows, so please tell us when the windows become overly smudged.

## PPE for photolithography

### **Materials:**

In addition to Lab entry requirements you may opt to wear a second pair of white nitrile gloves instead of the standard black, inside-out Butyl/Viton gloves. This is called 'double gloving'.

### **Incompatible Materials:**

Refer to chemical specific SOPs. Besides alcohols, almost all solvents can permeate the cleanroom standard Nitrile gloves. However two pairs will provide limited splash resistance to photoresist and acetone.

### **Hazards, Exposure Actions and PPE:**

Refer to chemical specific SOPs. Occasional, small splashes of photoresist will cause relatively little harm, though small consistent (Chronic) exposures can vastly increase your likelihood of poisoning or cancer. Keep in mind, acetone and photoresist will readily permeate the white gloves, so strip off your outer glove quickly (within 10 seconds) if you suspect you've been exposed. If you suspect your hand has been exposed, take especial care to wash under your fingernails when washing for 15 minutes.

### **Acceptable Locations For Use:**

Double gloving can be used in any chemical bay, and can be used on equipment and buttons provided the gloves are kept clean.

### **Additional Process Notes:**

For performing photolithography or develop, experienced lab members can opt to double glove with our standard thin white nitrile gloves. This provides additional dexterity, necessary for some projects. Check the hands of your gloves for photoresist contamination before touching anything outside the photolithography bay (like the phone or door handles). Both pairs of gloves should be discarded when exiting the cleanroom.