Personal Protective Equipment Selection Guide

Introduction

This **Personal Protective Equipment Selection Guide** has been developed by Environmental Health and Safety to assist the Stony Brook University researchers in selecting the most appropriate personal protective equipment, with an emphasis on glove selection, for chemical hazards.

Many chemicals known to be harmful to health can be easily absorbed into the body. The respiratory tract is usually the major route of entry for chemical exposures. These exposures can be controlled by work practices (keeping containers closed when not in use), fume hoods and respirators. Respirator selection must be made with the assistance of Environmental Health and Safety.

Another common source of chemical exposure is eye contact. Whenever there is the potential for eye contact, appropriate safety eyewear must be used. Chemical safety goggles are the only appropriate eyewear when handling hazardous liquid chemicals. Other eye hazards include dust particles, flying particles, and lasers. The appropriate eyewear must be worn to protect from these hazards. Selecting the appropriate eyewear is relatively easy.

Chemicals can also enter the body through the skin. In some cases, skin absorption may contribute a significant portion of the total body exposure to hazardous chemicals. Intact skin can be an effective barrier to many chemicals, however, minor cuts and abrasions can allow direct entry into the body. The skin can also be the target organ in the development of diseases such as dermatitis. Skin diseases can also increase the likelihood of absorption.

The skin can also be injured by physical hazards, such as thermal (hot and cold) burns, radiation, and cuts and lacerations. Protective clothing for these injuries can be easily selected.

Selecting protective clothing for chemical hazards can be difficult. This protective clothing can include gloves, aprons, lab coats, or full body clothing. This clothing can be manufactured from a variety of materials. The most important point to remember, is that no one material or chemical protective clothing will protect the user from all chemical hazards. Chemical protective clothing manufacturers conduct permeation and degradation tests on their garments. These data must be consulted before the appropriate protective clothing can be selected.

The Occupational Safety and Health Administration (OSHA 29 CFR 1910.132) states: *Protective equipment, including personal protective equipment for eyes, face, head and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.*

The OSHA regulation also requires that a hazard assessment of the workplace be performed to determine the need for personal protective equipment, and the employees receive training on the use and limitations of the selected personal protective equipment. Environmental Health and Safety can conduct the hazard assessment and training.

Read through this Guide to select the most appropriate gloves and other chemical protective clothing for the chemicals used in your laboratory. Contact Environmental Health and Safety for assistance with the selection process.

Choosing the Proper Protection

Before deciding which kind of glove or other chemical protective clothing to use, you should gather and analyze information on the following:

1. Complete and accurate description of the tasks.

2. *Identify of all hazards that may require protection*. This should include a list of the chemicals (including concentration or mixtures) involved as well as physical hazards such as abrasion, tearing, puncture and temperature (cryogenic), light (lasers, welding), noise and vibration.

3. *Nature of potential contact*. Will the contact with the chemical be, splash potential, occasional or continuous immersion? Other types of contact or exposure potential include spray (pressurized or nonpressurized), mist (continuous or intermittent), vapors (gaseous contact) and dust.

4. *Contact location*. What part of the body can the chemical potentially contact? Consider protection to the eyes, face, nose and mouth, body and feet.

5. *Contact time*. How long will the worker be in contact with the chemical may influence the selection of types and thickness of the glove material and the choice of lined or unlined gloves.

6. *Potential effects of skin exposure*. The immediate irritation or corrosion of the skin must be considered in addition to the potential health effects to the entire body from absorbing the chemical through the skin. NIOSH, OSHA or ACGIH may have a "skin designation" listed for the chemical (see Table 1).

7. *Decontamination procedures*. Consider whether the personal protective equipment should be disposed of or cleaned after use. If they are cleaned, consider the cleaning method, how often they can be cleaned, and any special procedures required for disposing of the decontamination waste.

8. *Flexibility and touch sensitivity needed for the task*. This need may significantly limit the thickness of glove material that can be used. The requirement for textured or non-slip surfaces to improve grip must also be considered.

9. *Training required*. This includes:
   - What are the hazards of skin contact with the chemical
   - What are the limitations of the personal protective equipment
   - What could happen and what to do if the personal protective equipment fails
   - When to dispose of or to decontaminate the personal protective equipment

10. *Latex allergy.* Are any of the employees allergic to latex or other components of the personal protective equipment? Latex allergies can result from repeated exposures to proteins in natural rubber latex though skin contact or inhalation. Contact EH&S for more information.

11. Use the "**Personal Protective Equipment Workplace Checklist**" to help analyze your workplace.

Ten Important Considerations for the Selection and Use of Protective Clothing

1. All chemicals pass or permeate through protective barriers sooner or later. Permeation can take place without any visible evidence or change in the protective materials. Color changes or changes in texture, as well as hardening or softening of the protective barriers after use, usually indicate degradation.

2. Even the best protective clothing products will not perform properly if they are torn, cut, or damaged. You should always inspect protective clothing before and after each use. Gloves can be checked for integrity leaks by inflation with air or even water. If your protective equipment becomes torn or damaged, replace it.

3. A barrier may protect against one chemical very well, but perform poorly against another or a mixture of chemicals. Each chemical and material combination must be considered. No single protective material is an absolute barrier against all chemicals.

4. The recommendations listed in this guide are generally based on tests that have been performed at room temperature. Higher temperatures usually decrease the breakthrough time (less time to breakthrough) of chemicals, while colder temperatures will tend to increase breakthrough times.

5. Generally, thicker is better. Increasing the thickness of a glove will normally increase the time to breakthrough, but the benefits may be offset by a decrease in tactility and dexterity. Thus use of multiple layers (e.g. double gloving) can increase thickness and provide properties of different materials. Gloves should be at least 0.3 mm thick.

6. Protective gloves and other chemical protective clothing may all look alike. Be sure that the material you are using is the right one for the job you are doing. Do not depend only on the appearance or color of the material, since most personal protective equipment is available in different forms and colors.

7. When a chemical has been absorbed by a protective clothing material, it will continue to permeate (pass through) the material. If the protective material has been contaminated to the point of breakthrough, it must be decontaminated before it may be used again. Simple soap and water washing will not be effective for matrix contamination or for most non-water soluble contaminants. Follow the manufacturer's cleaning instructions.

8. Some of the recommendations have been made on a generic basis. Most of the polymer formulations vary by manufacturer and can vary by product lot. Research has shown this variation in chemical resistance can be significant for Neoprene, Nitrile, and PVC. Users should check with the specific manufacturer selected to confirm the performance of their products.

9. Some protective clothing has a shelf life and or requires special storage measures, such as the avoidance of sunlight, ozone, or moisture. Check with the manufacturer for the proper storage, maintenance, and care.

10. The best way to select the proper chemical protective clothing is to have the material specifically tested under the work conditions and chemicals being used.

Contact Environmental Health and Safety for selection assistance.

From: Forsberg, Krister and Mansdorf, S.Z.. *Quick Selection Guide to Chemical Protective Clothing*. Third Edition. 1997. Van Nostrand Reinhold.

Personal Protective Equipment Workplace Checklist

	YES	NO
Has a workplace survey been conducted to determine which PPE items are necessary? Is this documented?		
Are annual task analyses completed for employees requiring PPE?		
Has a process or chemical changed occurred that requires additional levels of PPE? Were employees notified and training provided?		
Is a variety of sized PPE available as needed for employees?		
Are employees trained on the purpose of PPE and the hazards the PPE will protect them from?		
Are employees trained on the procedure for reporting damaged PPE items to the supervisor?		
Are employees trained on the use and limitations of the PPE?		
Have employees been trained and tested on how and when they are to use PPE?		
Are employee training records maintained, up to date, and accurate?		
Is all PPE maintained in a sanitary condition and ready to use?		
Are temporary or rotated employees, vendors, and visitors advised on the correct use of PPE? Are they required to wear PPE while in the work area?		
Has your MSDS information been surveyed for required PPE?		
Are procedures in place for decontamination and disposal of PPE?		
Are PPE items for reorder verified for the same level of protection when there are changes in manufacturers?		
Are adequate levels of PPE items maintained on site or accessible to employees when needed?		
Is PPE available at no cost to the employee?		
Are protective gloves, aprons, shields, or other means provided where there is a danger employees could be cut or exposed to corrosive, hazardous or infectious materials?		
Are procedures in place for cleaning up hazardous materials, including PPE decontamination?		
Are contaminated PPE disposed of in an approved manner?		
Are reusable PPE cleaned and inspected before reuse?		
Are reusable PPE inspected for normal wear and tear before each use and discarded as necessary?		
Is disciplinary action initiated when employees refuse to wear or otherwise damage PPE?		

Hand Protection

1. Choose hand protection that adequately protects from the hazards of a specific job and adequately meets the specific tasks involved in the job. Consult the manufacturer's permeation and degradation charts for chemical compatibility. See Table 1 for additional guidance. Some gloves may be certified to meet the European Union (EU) glove standards, described in Table 2.
2. Follow the manufacturer's instructions for care, decontamination and maintenance of gloves.
3. Be aware that some materials may cause reactions in some workers, such as allergies to latex. Offer alternatives where possible.
4. Ensure the gloves fit properly.
5. Ensure all exposed skin is covered by gloves. Gloves should be long enough so that there is no gap between glove and sleeve.
6. Do not wear gloves with metal parts near electrical equipment.
7. Do not use gloves that are ripped, torn or brittle.
8. Clean reusable gloves as instructed by the supplier.
9. Do not clean and reuse disposable gloves. They must be discarded after use.
10. Inspect and test all gloves (including new ones) for defects before using. This can be done by inflating them.

Hand Protection Checklist

	YES	NO
Are gloves used for chemical handling selected according to the manufacturer's permeation and degradation charts?		
Are employees trained in inspection, use and proper removal techniques?		
Are gloves inspected prior to each use?		
Is a selection of sizes available to workers?		
Are employees who demonstrate latex allergies provided with alternatives for use?		
Are appropriate decontamination and disposal guidelines in place?		

Table 1. Chemicals Requiring Skin Protection[1]

These chemicals present a significant risk of skin absorption and consequent toxicity. Chemicals not listed here may also require the use of personal protective equipment. Chemicals that have no "Recommended Glove" may not have been tested or no glove material passed the permeation and degradation tests. Engineering controls, work practice controls or other methods must be used to prevent or reduce skin exposure to these chemicals. Only the "Recommended Glove" listed was found to provide adequate chemical resistance. Do not use other glove types. Contact EH&S for additional guidance.

Chemical	***Hazard***	***Recommended Glove[2]***
1,1,2,2-Tetrachloroethane	Toxic, liver; CNS; GI	PVA[3]
1,1,2-Trichloroethane	Harmful, CNS; liver	PVA[3]
1,1-Dimethylhydrazine	Irritation; neoplasia	Butyl
1,3-Dichloropropene	Irritation	PVA[3]
1,4-Dichloro-2-butene	Cancer; irritation	PVA[3]
2,4,6-Trinitrotoluene (TNT)	Irritation; liver; blood	
2-Butoxyethanol (EGBE)	Irritation; CNS	Butyl, Neoprene, Nitrile
2-Chloropropionic acid	Irritation; reproductive	
2-Diethylaminoethanol	Irritation; CNS	
2-Ethoxyethanol (Cellosolve)	Reproductive	Butyl only
2-Ethoxyethyl acetate (Cellosolve acetate)	Reproductive	Butyl only
2-Methoxyethanol; (Methyl cellosolve)	Reproductive	Butyl only
2-Methoxyethyl acetate (Methyl cellosolve acetate)	Reproductive	Butyl only
2-N-Dibutylaminoethanol	Irritation; cholinergic	
3,3'-Dichlorobenzidine	Irritation; dermatitis	
Acetone cyanohydrin	CNS; anoxia	
Acrolein	Highly Toxic, Irritation; pulmonary edema	Butyl (0.6 mm)
Acrylamide	Harmful, CNS; dermatitis	Nitrile or Butyl
Acrylic acid	Toxic, Corrosive, Irritation; reproductive	Butyl, Neoprene (0.6 mm)
Acrylonitrile	Toxic, cancer, cancer	Butyl (0.7 mm) only
Adiponitrile	Harmful, lung	Butyl
Aldrin	Liver	
Allyl alcohol	Highly toxic, irritation	Butyl
Ammonium perfluorooctanoate	Liver	
Aniline	Toxic, anoxia	Butyl only

[1] As determined by OSHA or ACGIH: There is a potential significant contribution to the overall exposure by the cutaneous route, including mucous membranes and the eyes, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance. See endnote for definitions.
[2] Manufacturer's permeation and degradation charts must still be checked. Glove thicknesses vary and will provide different levels of protection. Gloves must be a minimum of 0.3 mm thick. Not all chemicals have been tested for glove type. Contact EH&S if glove type is not listed for a particular chemical.
[3] PVA – Poly Vinyl Alcohol. Do not immerse in water – glove will melt.

Chemical	*Hazard*	*Recommended Glove[2]*
Anisidine	Anoxia	
Azinphos-methyl	Toxic, cholinergic	Neoprene or Nitrile
Benzene	Toxic, cancer, cancer	PVA[3] only
Benzidine	Cancer	
Benzotrichloride	Irritation, cancer	
Bromoform	Irritation; liver	PVA[3]
Butanol	Harmful, Irritation; ototoxic; ocular	Butyl or Neoprene
Butylamine	Corrosive harmful, irritation	Teflon
Butylphenol	Irritation	
Captafol	Dermatitis; sensitization	
Carbon disulfide	Toxic, CVS; CNS; neuropathy	PVA[3]
Carbon tetrachloride	Toxic, Liver; cancer	PVA[3]
Catechol	Irritation; CNS; dermatitis	
Chlordane	Toxic, Seizures; liver	Teflon
Chlorinated camphene	Seizures; liver	
Chloroacetyl chloride	Toxic, Corrosive, Irritation; lung	Teflon
Chlorodiphenyl	Irritation; chloracne; liver	
Chloroprene	Harmful, Irritation; CNS; liver; blood	PVA[3]
Chloropyrifos	Cholinergic	
Cresol	Toxic, Corrosive, Dermatitis, irritation; CNS	Neoprene (0.7 mm)
Crotonaldehyde	Irritation	Butyl (0.6 mm)
Cumene	Harmful, irritation; cns	Teflon
Cyanides		
Cyclohexanol	Harmful, irritation; cns	Butyl, Neoprene or Nitrile
Cyclohexanone	Harmful, Irritation; liver	Butyl or PVA[3]
Cyclonite	Irritation; CNS; liver; blood	
Decaborane	CNS; pulmonary function	
Demeton	Cholinergic	
Diazinon	Cholinergic	
Dibutyl phenyl phosphate	Irritation; cholinergic	
Dichlorodiphenyltri-chloroethane (DDT)		
Dichloroethyl ether	Toxic, Cancer, Irritation; lung	Teflon
Dichlorvos	Cholinergic	
Dicrotophos	Cholinergic	
Dieldrin	Liver; CNS	
Diethanolamine	Irritant, Liver; kidney; blood	Butyl, Neoprene, Nitrile
Diethylamine	Corrosive harmful, irritation	Teflon
Diethylene triamine	Irritation; sensitization	
Diisopropylamine	Harmful, Sensitizer, Vision; irritation	Butyl
Dimethyl acetamide	Harmful, Reproductive; liver	Butyl
Dimethyl sulfate	Irritation	Butyl only
Dimethylaniline	Toxic, Anoxia; neurotoxicity	
Dimethylformamide	Harmful, liver	Butyl, Teflon
Dinitrobenzene	Anoxia	

Chemical	***Hazard***	***Recommended Glove[2]***
Dinitro-o-cresol	Metabolic disorders	
Dinitrotoluene	Toxic, CVS; reproductive; anoxia; liver	Butyl
Dioxane	Harmful, Irritation; liver; kidney	Butyl
Dipropylene glycol methyl ether	Irritation; CNS	
Endrin	CNS; liver	
Epichlorohydrin	Toxic, Cancer, Irritation; liver; kidney	Butyl or PVA[3]
EPN	Cholinergic	
Ethyl acrylate	Harmful, Irritation; sensitization	Butyl (0.6 mm), PVA[3]
Ethylene chlorohydrin	Highly Toxic, Irritation; liver; kidney; GI; CVS; CNS	Butyl or PVA[3]
Ethylene glycol dinitrate	CVS	
Ethylmorpholine	Irritation; occular	
Formaldehyde	Sensitization; cancer	Butyl, Nitrile
Furfural	Toxic, irritation	Butyl or PVA[3]
Furfuryl alcohol	Toxic, irritation	
Heptachlor	CNS; liver; blood	
Hexachloroethane	Irritation; liver; kidney	
Hexachloronaphthalene	Liver; chloracne	
Hexafluoroacetone	Reproductive; kidney	
Hydrazine	Toxic, Corrosive, Cancer, Irritation; liver	Butyl, Neoprene, Nitrile
Hydrogen cyanide	Highly Toxic, CNS; irritation; anoxia; lung; thyroid	Teflon
Isooctyl alcohol	Irritation	
Isophorone diisocyanate	Toxic, Dermatitis; asthma; sensitization	Butyl, Nitrile or PVA[3]
Lindane	CNS; liver	
Malathion	Cholinergic; CNS; neuropathy; vision	Teflon
Mercury (organic and inorganic)	Toxic, CNS; kidney; neuropathy; vision; reproductive; GI	Inorganic: Neoprene, Nitrile *Organic: Silvershield® <u>AND</u> Neoprene or Nitrile*
Methanol	Toxic, Neuropathy; vision; CNS	Butyl only
Methyacrylic acid	Corrosive irritation	Butyl
Methyl acrylate	Harmful, irritation	Butyl or PVA[3]
Methyl bromide	Toxic, Corrosive, Pulmonary edema; neurotoxicity; CNS	Butyl or Neoprene
Methyl hydrazine	Toxic, Irritation; liver	Butyl
Methyl iodide	Toxic, Corrosive, Cancer, CNS; irritation	PVA[3]
Methyl isobutyl carbinol	Irritation; anesthesia	
Methyl isocyanate	Highly Toxic, Irritation; pulmonary edema; sensitization	PVA[3]
Methylene chloride	CNS; anoxia; cancer	PVA[3]
Methylacrylonitrile	Irritation; CNS	

Chemical	*Hazard*	*Recommended Glove[2]*
Methylcyclohexanone	Irritation; narcosis	
Morpholine	Corrosive, Harmful, Irritation; vision	Butyl or PVA[3]
Naphthalene	Corrosive, Irritation; ocular; blood	Teflon
Nicotine	Highly toxic, CVS; GI; CNS	Teflon
Nitroaniline	Cyanosis; anoxia; liver; neurotoxicity; irritation; dermatitis	
Nitrobenzene	Toxic, Cyanosis; anoxia; liver; neurotoxicity; irritation; dermatitis	Butyl or PVA[3]
Nitrochlorobenzene	Anoxia; blood; liver	
Nitroglycerin	CVS	
Nitrotoluene	Toxic, Anoxia; cyanosis	Butyl
Octachloronaphthalene	Liver; dermatitis	
Paraquat	Pulmonary edema; kidney; liver; pulmonary fibrosis	
Parathion	Toxic, cholinergic	Neoprene or Nitrile
Pentachloronaphthalene	Chloracne; liver; CNS	
Pentachlorophenol	Toxic, irritation; CVS; CNS	Neoprene, Nitrile
Phenol	Toxic, Corrosive, Irritation; CNS; blood	Butyl, Neoprene
Phenylene diamine	Irritation, liver	
Phenylhydrazine	Dermatitis; anemia	
Phosdrin (Mevinphos)	Cholinergic	
Picric acid	TOXIC, Dermatitis; irritation; ocular; sensitization	Neoprene or Nitrile (0.6 mm)
Propanol	Harmful, Irritation; narcosis	Butyl, Nitrile
Propylene imine	Irritation; CNS	
Sodium azide	CNS; CVS; lung	
Sodium fluoroacetate	CNS; CVS	
TEDP (Sulfotep)	Cholinergic	
TEPP (Tetraethyl Pyrophosphaate)	Cholinergic	
Tert-Butyl chromate	Irritation; lung	
Tetrachloronaphthalene	Liver	
Tetraethyl lead	CNS	
Tetramethyl lead	CNS	
Tetramethyl succinonitrile	CNS	
Tetryl (2,4,6-Trinitrophenylmethylnitramine)	Irritation; liver; dermatitis	
Thallium	Irritation; CNS; CVS	
Thioglycolic acid	Irritation; lung	Butyl, Neoprene, PVA[3]
Tin (organic compounds)	CNS; immunotoxicity; irritation	
Toluene	Harmful, cns	PVA[3]
Toluidine	Toxic, Liver; kidney; blood	Teflon
Trichloronaphthalene	Liver	
Xylene	Harmful, irritation	PVA[3]

Chemical	*Hazard*	*Recommended Glove[2]*
Xylidine	Anoxia; liver; kidney	

Skin Designation (OSHA): To prevent or reduce skin exposure to substances listed by OSHA as "Skin Designation" by the use of gloves, coveralls, goggles, or other appropriate personal protective equipment, engineering controls or work practices.

Skin Notation (ACGIH): It should be noted that while some materials are capable of causing irritation, dermatitis, and sensitization in workers, these properties are not considered relevant when assigning a skin notation. It should be noted however that the development of a dermatological condition can significantly affect the potential for dermal absorption. In general, available data which suggest that the potential for absorption via the hands/forearms during the workday could be significant, especially for chemicals with lower Threshold Limit Values (TLVs), could justify a skin notation. From acute animal toxicity data, materials having a relatively low dermal Lethal Dose (LD_{50}) (1000 mg/kg of body weight or less) would be given a skin notation. Where repeated dermal application studies have shown significant systemic effects following treatment, a skin notation would be considered. When chemicals penetrate the skin easily and where extrapolations of systemic effects from other routes of exposure suggest dermal absorption may be important in the expressed toxicity, a skin notation would be considered. Substances having a skin notation and a low TLV may present special problems for operations involving high airborne concentrations of the material, particularly under conditions where significant areas of the skin are exposed for a long period of time. Under these conditions, special precautions to significantly reduce or preclude skin contact may be required. Use of the skin designation is intended to alert the reader that air sampling alone is insufficient to accurately quantitate exposure and that measures to prevent significant cutaneous absorption may be required.

Table 2. European Performance Standards for Gloves

TEST	PERFORMANCE LEVEL
Mechanical Hazards EN 388	
a. Resistance to abrasion	0-4 (0 is a fail or not tested)
b. Blade cut resistance	0-5
c. Tear resistance	0-4
d. Puncture resistance	0-4
e. Impact cut resistance	Pass
f. Antistatic	Pass
Chemicals and Micro-organisms EN 374	
Micro-organisms: Resistance to penetration by micro-organisms through porous materials, seams, pinholes, or other imperfection in the glove material. Referred to as acceptable quality level (AQL).	1-3
Resistance to Chemical Hazards: The measurement of time for a chemical to permeate though the glove material.	1-6
Thermal Hazards EN 407	
a. Resistance to flammability	0-4
b. Resistance to contact heat	0-4
c. Resistance to convective heat	0-3
d. Resistance to radiant heat	0-4
e. Resistance to small splashes of molten metal	0-4
f. Resistance to large splashes of molten metal	0-4
Protection from Cold EN 511	
a. Resistance to convective cold	0-4
b. Resistance to contact cold	0-4
c. Permeability of water	0-1

CE Compliance Categories: Glove compliance with European standards meets one of three categories intended to represent the level of potential risk to the user:

1. Simple Design: for minimal risks only, where the effects of the hazard are of minimal risk, and the consequences of contact are easily reversible.
2. Intermediate Design: gloves tested and certified against one or more hazards.
3. Complex Design: for irreversible or life-threatening danger; gloves are tested and certified against one or more hazards, and the manufacturer demonstrates acceptable quality-assurance practices. Gloves for hazardous chemical use must be of “Complex Design”.

Certified gloves are provided with a certificate from the certifying organization indicating compliance with all requirements of the relevant standards.

Chemical Protective Clothing Selection

1. Is the chemical identity and exposure scenario known?

YES: go to question 2.
NO: STOP! Contact Environmental Health and Safety for PPE evaluation.

2. Is the exposure to a gaseous or vapor hazard at a hazardous concentration?

YES: consider **TYPE 1** or **TYPE 2** Protective Garments.
NO: go to question 3.

3. Is the exposure to a liquid hazard?

YES: go to question 4.
NO: go to question 7.

4. Does the liquid produce vapor at a hazardous concentration (e.g. above the TLV or IDLH)?

YES: consider **TYPE 1 or TYPE 2** Protective Garments.
NO: go to question 5.

5. Is the liquid under pressure (i.e. pressurized tanks and lines)?

YES: consider **TYPE 3** Protective Garments.
NO: go to question 6.

6. Is the liquid exposure greater than a light to moderate splash?

YES: consider **TYPE 4** Protective Garments.
NO: consider **TYPE 6** Protective Garments.

7. Is the exposure to a particulate hazard?

YES: consider **TYPE 5** Protective Garments.

Type	***Reference***	***Description***
1	Gas Tight Chemical Protective Suit	Traditional "Level A" suit. A gas tight chemical protective suit with a breathable air supply that is independent of the ambient atmosphere (SCBA).
2	Non-Gas Tight Chemical Protective Suit	A non-gas tight chemical protective suit with breathable air providing positive pressure inside the suit from an independent source.
3	Liquid Tight Chemical Protective Clothing	Full body CPC with liquid tight connections between the gloves and cuffs, and the boots and legs. A 1 or 2 piece coverall with or without hoods and visors, boot socks, overbooties and attached boot.
4	Spray Tight Chemical Protective Clothing	Full body CPC with spray tight connections between the gloves and cuffs, and boots and legs. A 1 or 2 piece coverall with or without hoods and visors, boot socks, overbooties and attached boot.
5	Particulate Tight Chemical Protective Clothing	Full body CPC with particulate tight connections between the gloves and cuffs, and the boots and legs. A 1 or 2 piece coverall with or without hoods and visors, boot socks, overbooties and attached boot.
6	Partial Body Chemical Protective Clothing and Limited Spray Tight Chemical Protective Clothing	Partial body CPC with limited spray tight connections between different parts of the clothing (e.g. aprons, boot/shoe covers, gowns, hoods, jackets, lab coats, sleeve protectors, and smocks), or full body CPC with limited spray tight connections between the gloves and cuffs, and the boots and legs. A 1 or 2 piece coverall with or without hoods and visors, boot socks, overbooties and attached boot.