

APPENDIX B

Chemicals That May Be Absorbed By Skin or Eye Contact

The following chemicals have been identified by the Occupational Safety and Health Administration (OSHA)¹ and/or the American Conference of Governmental Industrial Hygienists (ACGIH)² as chemicals that require skin protection (or the use of other methods) to prevent or reduce skin exposure.

OSHA provides a "skin designation" to serve as a warning that cutaneous absorption should be prevented in order to avoid exceeding the absorbed dose received by inhalation at the permissible exposure limits (PEL). ACGIH provides a "skin" designation to refer to danger of cutaneous absorption and a potential for significant contribution to the overall exposure by the cutaneous route including the mucous membranes and the eyes.

Many chemicals not listed here also require the use of gloves because of other hazardous characteristics such as skin corrosivity.

Always refer to the glove manufacturers glove selection guides when choosing gloves for use with any chemical. Chemicals that are not listed may not have been tested. Some chemicals may not have an acceptable glove material based on the permeation and degradation tests. In this case, engineering controls, work practice controls or other methods must be used to prevent or reduce skin exposure to these chemicals. For more information refer to SOP 3.16, Personal Protective Equipment – Procedures for Selection and Use.

Manufacturer's glove selection guides are available at the glove manufacturer's websites or through the EHS websites. Additional references³ are also available that provide guidance for selecting glove materials or contact EHS for more information (see Laboratory Safety Contacts, pgs. ix-xi).

Chemical	CAS Number	Reference	
		OSHA ⁴	ACGIH ⁵
Acetone cyanohydrin	75-86-5		X
Acetonitrile	75-05-8		X
Acrolein	107-02-8		X
Acrylamide	79-06-1	X	X
Acrylic acid	79-10-7		X
Acrylonitrile	107-13-1	P	X
Adiponitrile	111-69-3		X
Aldrin	309-00-2	X	X
Allyl alcohol	107-18-6	X	X
Allyl bromide	106-95-6		X
Allyl chloride	107-05-1		X
4-Aminodiphenyl	92-67-1		X
Ammonium perfluorooctanoate	3825-26-1		X
Aniline	62-53-3	X	X
(<i>o</i> -, <i>p</i> -) Anisidine	90-04-0/104-94-9	X	X
ANTU	86-88-4		X
Azinphos-methyl	86-50-0	X	X
Benzene	71-43-2		X
Benzidine	92-87-5		X
Benzotrichloride	98-07-7		X
Beryllium, soluble compounds	7440-41-7		X
Bromoform	75-25-2	X	
2-Butoxyethanol (EGBE)	111-76-2	X	
<i>n</i> -Butylamine	109-73-9	X	X
<i>tert</i> -Butyl chromate (as CrO ₃)	1189-85-1	X	X
<i>n</i> -Butyl glycidyl ether	2426-08-6		X
<i>o</i> - <i>sec</i> -Butylphenol	89-72-5		X
Captafol	2425-06-1		X
Carbaryl	63-25-2		X

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		OSHA ⁴	ACGIH ⁵
Carbon disulfide	75-15-0		X
Carbon tetrachloride	56-23-5		X
Catechol	120-80-9		X
Chlordane	57-74-9	X	X
Chlorinated camphene	8001-35-2	X	X
Chloroacetone	78-95-5		X
Chloroacetyl chloride	79-04-9		X
<i>o</i> -Chlorobenzylidene malononitrile	2698-41-1		X
Chlorodiphenyl	53469-21-9/11097-69-1		X
β -Chloroprene	126-99-8	X	X
1-Chloro-2-propanol	127-00-4		X
2-Chloro-1-propanol	78-89-7		X
2-Chloropropionic acid	598-78-7		X
Chloropyrifos	2921-88-2		X
Citral	53-9240-5		X
Coumaphos	56-72-4		X
(<i>o</i> -, <i>m</i> -, <i>p</i> -) Cresol	1319-77-3; 95-48-7;108-39-4; 106-44-5	X	X
Crotonaldehyde	4170-30-3		X
Cumene	98-82-8	X	
Cyanide salts	592-01-8; 151-50-8; 143-33-9	X	X
Cyclohexanone	108-94-1		X
Cyclonite	121-82-4		X
2,4-D	94-75-7		X
Decaborane	11702-41-9	X	X
Demeton	8065-48-3		X
Demeton-S-methyl (Systox)	919-86-8	X	X
Diazinon	333-41-5		X
1,2-Dibromo-3-chloropropane		P	
2- <i>N</i> -Dibutylaminoethanol	102-81-8		X
Dibutyl phenyl phosphate	2528-36-1		X
Dibutyl phosphate	107-66-4		X
Dichloroacetic acid	79-43-6		X
3,3'-Dichlorobenzidine	91-94-1		X
1,4-Dichloro-2-butene	764-41-0		X
Dichlorodiphenyltri-chloroethane (DDT)	50-29-3	X	
Dichloroethyl ether	111-44-4	X	X
1,3-Dichloropropene	542-75-6		X
Dichlorvos (DDVP)	62-73-7	X	X
Dicrotophos	141-66-2		X
Dieldrin	60-57-1	X	X
Diesel fuel	68334-30-5; 68476-30-2; 68476-31-3; 68476-34-6; 77650-28-3		X
Diethanolamine	111-42-2		X
Diethylamine	109-89-7		X
2-Diethylaminoethanol	100-37-8	X	X
Diethylene triamine	111-40-0		X
Diisopropylamine	108-18-9	X	X
<i>N,N</i> -Dimethyl acetamide	127-19-5	X	X
bis (2-Dimethylaminoethyl) ether	3033-62-3		X
Dimethylaniline	121-69-7	X	X
Dimethyl carbamoyl chloride	79-44-7		X
Dimethyl disulfide	624-92-0		X
Dimethylformamide	68-12-2	X	X
1,1-Dimethylhydrazine	57-14-7	X	X
Dimethyl sulfate	77-78-1	X	X
(<i>o</i> -, <i>m</i> -, <i>p</i> -) Dinitrobenzene	528-29-0; 99-65-0; 100-25-4	X	X
Dinitro- <i>o</i> -cresol	534-52-1	X	X
Dinitrotoluene	25321-14-6	X	X
1,4-Dioxane (Diethylene dioxide)	123-91-1	X	X
Dioxathion	78-34-2		X
Dipropylene glycol methyl ether	34590-94-8	X	
Diquat	2764-72-9		X
Disulfoton	298-04-4		X
Endosulfan	115-29-7		X
Endrin	72-20-8	X	X

Chemicals That May Be Absorbed By Skin or Eye Contact (continued)

Chemical	CAS Number	Reference	
		OSHA ⁴	ACGIH ⁵
Epichlorohydrin	106-89-8	X	X
EPN	2104-64-5	X	X
Ethion	563-12-2		X
2-Ethoxyethanol (Cellosolve)	110-80-5	X	X
2-Ethoxyethyl acetate (Cellosolve acetate)	111-15-9	X	X
Ethyl acrylate	140-88-5	X	
Ethylamine	75-04-7		X
Ethyl bromide	74-96-4		X
Ethyl chloride	75-00-3		X
Ethylene chlorohydrin	107-07-3	X	X
Ethylenediamine	107-15-3		X
Ethylene dibromide	106-93-4		X
Ethylene glycol dinitrate	628-96-6	X	X
Ethylenimine	151-56-4		X
Ethyl isocyanate	109-90-0		X
N-Ethylmorpholine	100-74-3	X	X
Fenamiphos	22224-92-6		X
Fensulfothion	115-90-2		X
Fenthion	55-38-9		X
Fonofos	944-22-9		X
Formaldehyde	50-00-0	X	
Formamide	75-12-7		X
Furfural	98-01-1	X	X
Furfuryl alcohol	98-00-0		X
Heptachlor & heptachlor epoxide	76-44-8; 1024-57-3	X	X
Hexachlorobenzene	118-74-1		X
Hexachlorobutadiene	87-68-3		X
Hexachloroethane	67-72-1	X	X
Hexachloronaphthalene	1335-87-1	X	X
Hexafluoroacetone	684-16-2		X
Hexamethylphosphoramide	680-31-9		X
n-Hexane	110-54-3		X
Hydrazine	302-01-2		X
Hydrogen cyanide	74-90-8	X	X
Hydrogen fluoride	7664-39-3		X
2-Hydroxypropyl acrylate	999-61-1		X
Isooctyl alcohol	26952-21-6		X
2-Isopropoxyethanol	109-59-1		X
N-Isopropylaniline	768-52-5		X
Kerosene	8008-20-6		X
Latex, natural rubber latex as total proteins	9006-04-6		X
Lindane	58-89-9	X	X
Malathion	121-75-5	X	X
Manganese cyclopentadienyl tricarbonyl	12079-65-1		X
Mercury (Inorganic)	7439-97-6		X
Mercury (Organic):	7439-97-6		X
Methanol	67-56-1		X
Methomyl	16752-77-5		X
2-Methoxyethanol; (Methyl cellosolve)	109-86-4	X	X
2-Methoxyethyl acetate (Methyl cellosolve acetate)	110-49-6	X	X
bis-(2-Methoxypropyl) ether (DPGME)	34590-94-8		X
Methyl acrylate	96-33-3	X	X
Methylacrylonitrile	126-98-7		X
N-Methyl aniline	100-61-8		X
Methyl bromide	74-83-9	X	X
Methyl n-butyl ketone	591-78-6		X
Methyl chloride	74-87-3		X
o-Methylcyclohexanone	583-60-8	X	X
2-Methylcyclopentadienyl manganese tricarbonyl	12108-13-3		X
Methyl demeton	8022-00-2		X
4,4'-Methylene bis(2-chloroaniline)	101-14-4		X
4-4'-Methylene dianiline	1071-77-9		X
Methyl hydrazine	60-34-4	X	X
Methyl iodide	74-88-4	X	X
Methyl isobutyl carbinol	108-11-2	X	X

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Chemical	CAS Number	Reference	
		OSHA ⁴	ACGIH ⁵
Methyl isocyanate	624-83-9	x	x
1-Methylnaphthalene	90-12-0		x
2-Methylnaphthalene	91-57-6		x
Methyl parathion	298-00-0		x
Methyl vinyl ketone	78-94-4		x
Mevinphos (Phosdrin)	7786-34-7		x
Monochloroacetic acid	79-11-8		x
Monocrotophos	6923-22-4		x
Monomethyl aniline	100-61-8	x	
Morpholine	110-91-8	x	x
Naled	300-76-5		x
Naphthalene	91-20-3		x
Nicotine	54-11-5	x	x
<i>p</i> -Nitroaniline	100-01-6	x	x
Nitrobenzene	98-95-3	x	x
<i>p</i> -Nitrochlorobenzene	100-00-5	x	x
4-Nitrodiphenyl	92-93-3		x
Nitroglycerin	55-63-0	x	x
<i>N</i> -Nitrosodimethylamine	62-75-9		x
(<i>o</i> -, <i>m</i> -, <i>p</i> -) Nitrotoluene	88-72-2; 99-08-1; 99-99-0	x	x
Octachloronaphthalene	2234-13-1	x	x
Paraquat	4685-14-7	x	
Parathion	56-38-2	x	x
Pentachloronaphthalene	1321-64-8	x	x
Pentachlorophenol	87-86-5	x	x
2,4-Pentanedione	123-54-6		x
Phenol	108-95-2	x	x
Phenothiazine	92-84-2		x
Phenyl glycidyl ether	122-60-1		x
<i>p</i> -Phenylene diamine	106-50-3	x	
Phenylhydrazine	100-63-0	x	x
Phenyl mercaptan	108-98-5		x
Phorate	298-02-2		x
Phosdrin (Mevinphos)	7786-34-7	x	
Picric acid (2,4,6-trinitrophenol)	88-89-1	x	
Propargyl alcohol	107-19-7		x
Propylene glycol dinitrate	6423-43-4		x
Propylenimine	75-55-8	x	x
Sodium fluoroacetate	62-74-8	x	x
Sulfotep (TEDP)	3689-24-5	x	x
Sulprofos	35400-43-2		x
Temephos	3383-96-8		x
Terbufos	13071-79-9		x
1,1,1,2-Tetrachloroethane	79-34-5	x	x
Tetrachloronaphthalene	1335-88-2	x	
Tetraethyl lead	78-00-2	x	x
Tetraethyl pyrophosphate (TEPP)	107-49-3	x	x
Tetrahydrofuran	109-99-9		x
Tetramethyl lead	75-74-1	x	x
Tetramethyl succinonitrile	3333-52-6	x	x
Tetryl (2,4,6-Trinitrophenylmethylnitramine)	479-45-8	x	
Thallium, soluble compounds	7440-28-0	x	x
Thioglycolic acid	68-11-1		x
Tin (organic compounds)	7440-31-5		x
Tolidine	119-93-7		x
(<i>o</i> -, <i>m</i> -, <i>p</i> -) Toluidine	95-53-4; 108-44-1; 106-49-0	x	x
1,1,2-Trichloroethane	79-00-5	x	x
Trichloronaphthalene	1321-65-9	x	x
1,2,3 Trichloropropane	96-18-4		x
Triethylamine	121-44-8		x
Trimellitic anhydride	552-30-7		x
2,4,6-Trinitrotoluene (TNT)	118-96-7	x	x
Triorthocresyl phosphate	78-30-8		x

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Chemical	CAS Number	Reference	
		OSHA ⁴	ACGIH ⁵
Triorthocresyl phosphate	78-30-8		X
Vinyl cyclohexene dioxide	106-87-6		X
<i>m</i> -Xylene α,α' -diamine	1477-55-0		X
Xylidine (mixed isomers)	1300-73-8	X	X

Notes: 1. Title 29, Code of Federal Regulations, Part 1910.1000 (29 CFR Part 1910.1000), Air Contaminants, Table Z-1, Limits for Air Contaminants.

2. American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, 2014.

3. Refer to manufacturer's permeation and degradation charts for glove selection. Glove thicknesses vary and will provide different levels of protection. Not all chemicals have been tested for glove type. Contact EHS if glove type is not listed for a particular chemical. The following references provide additional information regarding glove materials and chemical resistance.

a. McConville, Francis X., The Pilot Plant Real Book, 2002, pg. 9-13, Glove Selection Guide.

b. Furr, A. Kieth, CRC Handbook of Laboratory Safety, 5th Ed., 2000, Table 6.2, Resistant Properties of Selected Materials by Class, pg 742-743.

4. Skin Designation (OSHA): Skin exposure to substances listed by OSHA with "Skin Designation" must be reduced or prevented by the use of gloves, coveralls, goggles, or other appropriate personal protective equipment, engineering controls, or work practices. "P" – Dermal (skin) or eye exposure prohibited by regulation.

5. Skin Notation (ACGIH): The ACGIH "Skin Notation" refers to the potential for 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. Vehicles present in mixtures can also significantly enhance potential skin absorption. 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 the ACGIH skin notation. The development of a dermatological condition, however, can significantly affect the potential for dermal absorption. Use of the skin designation is intended to alert the reader that air sampling alone is insufficient to accurately quantify exposure and that measures to prevent significant cutaneous absorption may be required.