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Recommendations for Chemical Protective Clothing

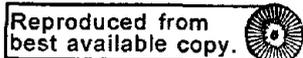
A Companion to the *NIOSH Pocket Guide to Chemical Hazards*

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<p>16. Abstract (Limit: 200 words) Chemical protective clothing (CPC) recommendations were provided in tabular format for each of the chemicals listed in the NIOSH Pocket Guide to Chemical Hazards, June 1997 Edition. The following skin protection designations were discussed: prevent skin contact, frostbite, and no recommendation (NR). The prevent skin contact designation means that there is a potential hazard resulting from dermal exposure. The CPC should provide resistance to permeation, penetration and degradation: The designation of preventing skin contact is also listed for materials that are solids such as dust, powder, flakes, and fibers where there is a potential for either ingestion or inhalation but no significant dermal hazard. The frostbite designation alerts the user to the potential for freezing of the skin from direct contact with the liquefied gas through rapid evaporation. The NR designation means that no recommendation can be made either because the chemical has not been shown to be a dermal hazard or that inadequate information is available.</p> <p style="text-align: center;">PROTECTED UNDER INTERNATIONAL COPYRIGHT ALL RIGHTS RESERVED. NATIONAL TECHNICAL INFORMATION SERVICE U.S. DEPARTMENT OF COMMERCE</p>				
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Recommendations for Chemical Protective Clothing

There are many chemicals which can cause adverse effects on unprotected skin ranging from contact dermatitis to permeation of the skin and systemic toxic effects. In addition, some chemicals (mostly solids) can present a contamination problem where inadvertent ingestion (e.g., lead) could occur or re-entrainment in the airstream (e.g., asbestos) could lead to inhalation. Chemical protective clothing (CPC), comprising gloves, boots, suits and other related components, can prevent direct skin contact and contamination. CPC can also prevent physical injury to the unprotected skin from thermal hazards such as from rapidly evaporating liquidified gases freezing the skin (e.g., LPG).

This report provides CPC recommendations for the chemicals listed in the *NIOSH Pocket Guide to Chemical Hazards, June 1997 Edition* (Publication No. 97-140). These recommendations are based on another published work, *Quick Selection Guide to Chemical Protective Clothing, Third Edition*, by Krister Forsberg and S.Z. Mansdorf (1997).

The *Pocket Guide* provides general recommendations for skin protection according to the following designations:

- Prevent skin contact
- Frostbite
- N.R.

For the purposes of this report, the definitions of these designations are slightly different than those published in the *Pocket Guide*.

The "prevent skin contact" designation means that there is a dermal hazard potential. For work situations where direct contact could occur, it is recommended that CPC providing resistance to permeation, penetration and degradation be used where the chemical has a potential to contact unprotected skin. A standard test method for permeation resistance has been devised by the American Society for Testing and Materials (ASTM) titled, *Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases Under Conditions of Continuous Contact (method F739-91)*. This test determines both the breakthrough time and steady state permeation rate of chemicals through a sample of the protective barrier. All chemicals will eventually permeate protective clothing. Breakthrough (permeation) resistance is related to temperature of the challenge material and the environment and thickness of the barrier. Therefore, higher than normal (25°C) temperatures will result in faster breakthrough. Use of thicker materials will increase time to breakthrough of the chemical.

The ASTM method establishes the time to breakthrough under conditions of continuous liquid or gaseous contact. Hence, a breakthrough time reported as 4 hours means four hours of resistance to permeation at detection levels generally above one-tenth microgram per square centimeter per minute (0.1 $\mu\text{g}/\text{cm}^2/\text{min}$) at standard temperature conditions. Published breakthrough data from academic institutions, research organizations, trade associations, chemical manufacturers, protective clothing manufacturers and others can be used to select protective clothing in conjunction with other considerations. Not all chemicals nor barriers have been tested and the results published. For some chemicals listed in the *Pocket Guide*, no information is available. For many of the solids, such as pesticides, the proper selection of protective clothing depends on the exact solvent system and formulation hence for many no recommendations are made.

Additionally, new barriers, barriers that have not been considered, or new testing may result in recommendations different from those listed in this report. Therefore, both the chemical and the protective clothing supplier should be contacted for the most appropriate choice before any final selection is made.

The "prevent skin contact" designation will also be found for materials that are solids (e.g., dust, powder, flakes, fibers, etc.). This designation is meant to alert the reader to inadvertent contamination of the skin resulting in the potential for later ingestion or inhalation but no significant dermal hazard. It is recommended that these chemicals not be allowed to contact the skin to prevent cross contamination. As a dry solid, there is no permeation potential- only a penetration potential through holes, tears, loose weaves, etc. for natural fibers and polymers. Therefore, any barrier which will prevent penetration may be used for the dry chemical **provided that the dry solid is not placed into solution.**

The "frostbite" designation is meant to alert the reader to the potential for freezing of the skin from direct contact with the liquidified gas through rapid evaporation. Some liquified gases may also present a direct skin hazard or a toxic hazard. For example, chlorine as a liquidified gas is corrosive, especially to wet skin, while hydrogen cyanide as a liquidified gas can permeate the skin leading to serious injury or death.

The "N.R." designation means that no recommendation can be made either because the chemical has not been shown to be a dermal hazard or inadequate information is available. Cellulose, for example, would not be expected to present a problem under normal circumstances. Nevertheless, each situation should be evaluated by a competent industrial hygienist or safety professional to determine whether protective clothing should be used.

Recommendations for skin protection and CPC are provided in the table below. The chemicals and their corresponding Chemical Abstract Service (CAS) numbers are listed in the same order as they appear in the *Pocket Guide*. A list of abbreviations and explanations follow the table.

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Acetaldehyde	75-07-0	Prevent skin contact	8 hr: Butyl, Responder, Tychem 4 hr: Teflon, PE/EVAL
Acetic acid	64-19-7	Prevent skin contact	8 hr: Butyl, Teflon, Viton, PE/EVAL, Responder, Tychem 4 hr: Neoprene, Barricade
Acetic anhydride	108-24-7	Prevent skin contact	8 hr: Butyl, PE/EVAL, Barricade, Trelchem, Tychem 4 hr: Teflon
Acetone	67-64-1	Prevent skin contact	8 hr: Butyl, PE/EVAL, Barricade, CPF3, Responder, Trelchem, Tychem
Acetone cyanohydrin	75-86-5	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Acetonitrile	75-05-8	Prevent skin contact	8 hr: Butyl, Teflon, PE/EVAL, Barricade, Responder, Trelchem, Tychem
2-Acetylaminofluorene	53-96-3	Prevent skin contact	Contact the manufacturer for recommendations
Acetylene	74-86-2	Frostbite	Prevent possible skin freezing from direct liquid contact.
Acetylene tetrabromide	79-27-6	Prevent skin contact	Contact the manufacturer for recommendations
Acetylsalicylic acid	50-78-2	Prevent skin contact	Contact the manufacturer for recommendations
Acrolein	107-02-8	Prevent skin contact	8 hr: Butyl, Barricade, Tychem
Acrylamide	79-06-1	Prevent skin contact	8 hr: Butyl, Tychem 4 hr: Nitrile, PVC, Viton, PE/EVAL
Acrylic acid	79-10-7	Prevent skin contact	8 hr: Butyl, Saranex, Responder, Trelchem 4 hr: Teflon, Viton, PE/EVAL
Acrylonitrile	107-13-1	Prevent skin contact	8 hr: Butyl, PE/EVAL, Barricade, Responder, Tychem
Adiponitrile	111-69-3	Prevent skin contact	4 hr: Teflon
Aldrin	309-00-2	Prevent skin contact	Contact the manufacturer for recommendations
Allyl alcohol	107-18-6	Prevent skin contact	8 hr: Butyl, Teflon, Barricade, Responder, Tychem 4 hr: Viton
Allyl chloride	107-05-1	Prevent skin contact	8 hr: Tychem 4 hr: Teflon, PE/EVAL
Allyl glycidyl ether	106-92-3	Prevent skin contact	Contact the manufacturer for recommendations
Allyl propyl disulfide	2179-59-1	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
α-Alumina	1344-28-1	N.R.	Determine based on working conditions
Aluminum	7429-90-5	N.R.	Determine based on working conditions
Aluminum (pyro powders and welding fumes, as Al)		N.R.	Determine based on working conditions
Aluminum (soluble salts and alkyls, as Al)		N.R.	Determine based on working conditions
4-Aminodiphenyl	92-67-1	Prevent skin contact	Contact the manufacturer for recommendations
2-Aminopyridine	504-29-0	Prevent skin contact	Contact the manufacturer for recommendations
Amitrole	61-82-5	Prevent skin contact	Contact the manufacturer for recommendations
Ammonia	7664-41-7	Prevent skin contact	8 hr: Butyl, Teflon, Viton, Responder, Trelchem, Tychem 4 hr: Nitrile
Ammonium chloride fume	12125-02-9	Prevent skin contact	Any barrier that will prevent contamination from the dry chemical
Ammonium sulfamate	7773-06-0	Prevent skin contact	Contact the manufacturer for recommendations
n-Amyl acetate	628-63-7	Prevent skin contact	8 hr: Barricade, Responder 4 hr: PVA, Teflon
sec-Amyl acetate	626-38-0	Prevent skin contact	Contact the manufacturer for recommendations
Aniline (and homologs)	62-53-3	Prevent skin contact	8 hr: Butyl, PVA, PE/EVAL, Barricade, Responder, Trelchem 4 hr: Teflon, Viton, Saranex
o-Anisidine	90-04-0	Prevent skin contact	Contact the manufacturer for recommendations
p-Anisidine	104-94-9	Prevent skin contact	Contact the manufacturer for recommendations
Antimony	7440-36-0	Prevent skin contact	Any barrier that will prevent contamination from the dry chemical

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
ANTU	86-88-4	Prevent skin contact	Contact the manufacturer for recommendations
Arsenic (inorganic compounds, as As)	7440-38-2 (metal)	Prevent skin contact	Contact the manufacturer for recommendations
Arsenic, organic compounds (as As)		Recommendations regarding personal protective clothing vary depending upon the specific compound	Contact the manufacturer for recommendations
Arsine	7784-42-1	Prevent skin contact/ Frostbite	Contact the manufacturer for recommendations Prevent possible skin freezing from direct liquid contact
Asbestos	1332-21-4	Prevent skin contact	Any barrier that will prevent contamination from the fiber
Asphalt fumes	8052-42-4	Prevent skin contact	Contact the manufacturer for recommendations
Atrazine	1912-24-9	Prevent skin contact	Contact the manufacturer for recommendations
Azinphos-methyl	86-50-0	Prevent skin contact	8 hr: Neoprene, Nitrile
Barium chloride (as Ba)	10361-37-2	Prevent skin contact	Contact the manufacturer for recommendations
Barium nitrate (as Ba)	10022-31-8	Prevent skin contact	Contact the manufacturer for recommendations
Barium sulfate	7727-43-7	Prevent skin contact	Contact the manufacturer for recommendations
Benomyl	17804-35-2	Prevent skin contact	Contact the manufacturer for recommendations
Benzene	71-43-2	Prevent skin contact	8 hr: PVA, PE/EVAL, Barricade, CPF3, Responder, Tychem 4 hr: Teflon, Viton
Benzenethiol	108-98-5	Prevent skin contact	Contact the manufacturer for recommendations
Benzidine	92-87-5	Prevent skin contact	Contact the manufacturer for recommendations
Benzoyl peroxide	94-36-0	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Benzyl chloride	100-44-7	Prevent skin contact	8 hr: PE/EVAL, CPF3, Responder, Tychem 4 hr: Teflon
Beryllium & beryllium compounds (as Be)	7440-41-7 (metal)	Prevent skin contact	Contact the manufacturer for recommendations
Bismuth telluride, doped with Selenium sulfide (as Bi ₂ Te ₃)		Prevent skin contact	Contact the manufacturer for recommendations
Bismuth telluride, undoped	1304-82-1	Prevent skin contact	Contact the manufacturer for recommendations
Borates, tetra, sodium salts (Anhydrous)	1330-43-4	N.R.	Determine based on working conditions
Borates, tetra, sodium salts (Decahydrate)	1303-96-4	N.R.	Determine based on working conditions
Borates, tetra, sodium salts (Pentahydrate)	12179-04-3	N.R.	Determine based on working conditions
Boron oxide	1303-86-2	Prevent skin contact	Contact the manufacturer for recommendations
Boron tribromide	10294-33-4	Prevent skin contact	Contact the manufacturer for recommendations
Boron trifluoride	7637-07-2	Prevent skin contact	8 hr: Teflon, Responder
Bromacil	314-40-9	Prevent skin contact	Contact the manufacturer for recommendations
Bromine	7726-95-6	Prevent skin contact	4 hr: Teflon
Bromine pentafluoride	7789-30-2	Prevent skin contact	Contact the manufacturer for recommendations
Bromoform	75-25-2	Prevent skin contact	8 hr: PVA, Viton
1,3-Butadiene	106-99-0	Prevent skin contact	8 hr: Viton, Saranex, Barricade, CPF3, Responder, Trelchem, Tychem 4 hr: Teflon
n-Butane	106-97-8	Frostbite	Prevent possible skin freezing from direct liquid contact
2-Butanone	78-93-3	Prevent skin contact	8 hr: Butyl, Teflon, PE/EVAL, Barricade, CPF3, Tychem 4 hr: Responder

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers*
2-Butoxyethanol	111-76-2	Prevent skin contact	8 hr: Butyl, Viton, Saranex 4 hr: PE/EVAL
2-Butoxyethanol acetate	112-07-2	Prevent skin contact	Contact the manufacturer for recommendations
n-Butyl acetate	123-86-4	Prevent skin contact	8 hr: PE/EVAL 4 hr: PVA, Teflon
sec-Butyl acetate	105-46-4	Prevent skin contact	Contact the manufacturer for recommendations
tert-Butyl acetate	540-88-5	Prevent skin contact	Contact the manufacturer for recommendations
Butyl acrylate	141-32-2	Prevent skin contact	8 hr: PE/EVAL, Responder, Tychem 4 hr: Teflon
n-Butyl alcohol	71-36-3	Prevent skin contact	8 hr: Butyl, Teflon, Viton, PE/EVAL, Barricade, CPF3, Responder 4 hr: Neoprene
sec-Butyl alcohol	78-92-2	Prevent skin contact	8 hr: PE/EVAL 4 hr: Butyl, Nitrile
tert-Butyl alcohol	75-65-0	Prevent skin contact	8 hr: Butyl, PE/EVAL, Responder
n-Butylamine	109-73-9	Prevent skin contact	8 hr: Responder, Tychem 4 hr: Trelchem
tert-Butyl chromate	1189-85-1	Prevent skin contact	Contact the manufacturer for recommendations
n-Butyl glycidyl ether	2426-08-6	Prevent skin contact	Contact the manufacturer for recommendations
n-Butyl lactate	138-22-7	Prevent skin contact	Contact the manufacturer for recommendations
n-Butyl mercaptan	109-79-5	Prevent skin contact	Contact the manufacturer for recommendations
o-sec-Butylphenol	89-72-5	Prevent skin contact	Contact the manufacturer for recommendations
p-tert-Butyltoluene	98-51-1	Prevent skin contact	8 hr: PVA, Viton 4 hr: Nitrile, PE/EVAL

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
n-Butyronitrile	109-74-0	Prevent skin contact	Contact the manufacturer for recommendations
Cadmium dust (as Cd)	7440-43-9 (metal)	Prevent skin contact	Any barrier that will prevent contamination from the dry chemical
Cadmium fume (as Cd)	1306-19-0 (CdO)	Prevent skin contact	8 hr: Neoprene, Nitrile
Calcium arsenate (as As)	7778-44-1	Prevent skin contact	Contact the manufacturer for recommendations
Calcium carbonate	1317-65-3	N.R.	Determine based on working conditions
Calcium cyanamide	156-62-7	Prevent skin contact	Contact the manufacturer for recommendations
Calcium hydroxide	1305-62-0	Prevent skin contact	8 hr: Natural, Neoprene, Nitrile
Calcium oxide	1305-78-8	Prevent skin contact	Any barrier that will prevent contamination from the dry chemical
Calcium silicate	1344-95-2	N.R.	Determine based on working conditions
Calcium sulfate	7778-18-9	N.R.	Determine based on working conditions
Camphor (synthetic)	76-22-2	Prevent skin contact	Contact the manufacturer for recommendations
Caprolactam	105-60-2	Prevent skin contact	Contact the manufacturer for recommendations
Captafol	2425-06-1	Prevent skin contact	Contact the manufacturer for recommendations
Captan	133-06-2	Prevent skin contact	Contact the manufacturer for recommendations
Carbaryl	63-25-2	Prevent skin contact	(Sevin 50 W) 4 hr: Natural, Neoprene, Nitrile, PVC
Carbofuran	1563-66-2	Prevent skin contact	Contact the manufacturer for recommendations
Carbon black	1333-86-4	N.R.	Determine based on working conditions
Carbon dioxide	124-38-9	Frostbite	Prevent possible skin freezing from direct liquid contact

Chemical	CAS No.	Recommendation for skin protection ¹	Recommended protective clothing barriers ²
Carbon disulfide	75-15-0	Prevent skin contact	8 hr: PVA, Viton, PE/EVAL, Barricade, Responder, Trelchem, Tychem 4 hr: Teflon
Carbon monoxide	630-08-0	Frostbite	Prevent possible skin freezing from direct liquid contact
Carbon tetrabromide	558-13-4	N.R.	Determine based on working conditions
Carbon tetrachloride	56-23-5	Prevent skin contact	8 hr: PVA, Viton, PE/EVAL, Barricade, Responder 4 hr: Teflon
Carbonyl fluoride	353-50-4	Frostbite	Prevent possible skin freezing from direct liquid contact
Catechol	120-80-9	N.R.	Determine based on working conditions
Cellulose	9004-34-6	N.R.	Determine based on working conditions
Cesium hydroxide	21351-79-1	Prevent skin contact	Contact the manufacturer for recommendations
Chlordane	57-74-9	Prevent skin contact	8 hr: CPF3, Trelchem 4 hr: Teflon
Chlorinated camphene	8001-35-2	Prevent skin contact	Contact the manufacturer for recommendations
Chlorinated diphenyl oxide		Prevent skin contact	Contact the manufacturer for recommendations
Chlorine	7782-50-5	Frostbite	Prevent possible skin freezing from direct liquid contact
Chlorine dioxide	10049-04-4	Prevent skin contact (liquid)	Contact the manufacturer for recommendations
Chlorine trifluoride	7790-91-2	Prevent skin contact	Contact the manufacturer for recommendations
Chloroacetaldehyde	107-20-0	Prevent skin contact	Contact the manufacturer for recommendations
α -Chloroacetophenone	532-27-4	Prevent skin contact	8 hr: Responder

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Chloroacetyl chloride	79-04-9	Prevent skin contact	4 hr: Teflon
Chlorobenzene	108-90-7	Prevent skin contact	8 hr: Viton, Barricade, Responder, Trelchem, Tychem 4 hr: PVA, Teflon
o-Chlorobenzylidene malononitrile	2698-41-1	Prevent skin contact	Contact the manufacturer for recommendations
Chlorobromomethane	74-97-5	Prevent skin contact	4 hr: Teflon, Responder
Chlorodifluoromethane	75-45-6	Frostbite	Prevent possible skin freezing from direct liquid contact
Chlorodiphenyl (42% chlorine)	53469-21-9	Prevent skin contact	8 hr: Butyl, Neoprene, Teflon, Viton, Saranex, Barricade, Responder 4 hr: PE/EVAL
Chlorodiphenyl (54% chlorine)	11097-69-1	Prevent skin contact	8 hr: Butyl, Neoprene, Teflon, Viton, Saranex, Barricade, Responder 4 hr: PE/EVAL
Chloroform	67-66-3	Prevent skin contact	8 hr: PVA, Viton, PE/EVAL, Barricade, Responder, Trelchem, Tychem 4 hr: Teflon
bis-Chloromethyl ether	542-88-1	Prevent skin contact	Contact the manufacturer for recommendations
Chloromethyl methyl ether	107-30-2	Prevent skin contact	4 hr: Teflon
1-Chloro-1-nitropropane	600-25-9	Prevent skin contact	Contact the manufacturer for recommendations
Chloropentafluoro ethane	76-15-3	Frostbite	Prevent possible skin freezing from direct liquid contact
Chloropicrin	76-06-2	Prevent skin contact	Contact the manufacturer for recommendations
β-Chloroprene	126-99-8	Prevent skin contact	8 hr: PVA, Viton, Responder
o-Chlorostyrene	2039-87-4	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
o-Chlorotoluene	95-49-8	Prevent skin contact	8 hr: Barricade 4 hr: Viton
2-Chloro-6-trichloro methyl pyridine	1929-82-4	Prevent skin contact	Contact the manufacturer for recommendations
Chlorpyrifos	2921-88-2	Prevent skin contact	Contact the manufacturer for recommendations
Chromic acid and chromates	1338-82-0 (CrO ₃)	Prevent skin contact	(As Chromic Acid) 8 hr: PE, PVC, Saranex 4 hr: Butyl, Viton
Chromium(II) compounds (as Cr)		Prevent skin contact	Contact the manufacturer for recommendations for the specific compound
Chromium(III) compounds (as Cr)		Prevent skin contact	Contact the manufacturer for recommendations for the specific compound
Chromium metal	7440-47-3	N.R.	Determine based on working conditions
Chromyl chloride	14977-61-8	Prevent skin contact	Contact the manufacturer for recommendations
Clopidol	2971-90-6	N.R.	Determine based on working conditions
Coal dust		N.R.	Determine based on working conditions
Coal tar pitch volatiles	65996-93-2	Prevent skin contact	Contact the manufacturer for recommendations
Cobalt metal dust and fume (as Co)	7440-48-4	Prevent skin contact	Contact the manufacturer for recommendations
Cobalt carbonyl (as Co)	10210-68-1	Prevent skin contact	Contact the manufacturer for recommendations
Cobalt hydrocarbonyl (as Co)	16842-03-8	Prevent skin contact	Contact the manufacturer for recommendations
Coke oven emissions		Prevent skin contact	Recommendations will depend on specific nature of emissions
Copper (dusts and mists, as Cu)	7440-50-8	Prevent skin contact	Contact the manufacturer for recommendations
Copper fume (as Cu)	1317-38-0 (CuO)	N.R.	Determine based on working conditions
Cotton dust (raw)		N.R.	Determine based on working conditions

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Crag® herbicide	136-78-7	Prevent skin contact	Contact the manufacturer for recommendations
o-Cresol	95-48-7	Prevent skin contact	Contact the manufacturer for recommendations
m-Cresol	108-39-4	Prevent skin contact	4 hr: Neoprene, Teflon
p-Cresol	106-44-5	Prevent skin contact	4 hr: PE/EVAL
Crotonaldehyde	4170-30-3	Prevent skin contact	8 hr: Butyl, Responder 4 hr: Teflon
Crufomate	299-86-5	Prevent skin contact	Contact the manufacturer for recommendations
Cumene	98-82-8	Prevent skin contact	8 hr: Tychem 4 hr: Teflon
Cyanamide	420-04-2	Prevent skin contact	Contact the manufacturer for recommendations
Cyanogen	460-19-5	Frostbite	Prevent possible skin freezing from direct liquid contact
Cyanogen chloride	506-77-4	Prevent skin contact (liquid)	4 hr: Teflon
Cyclohexane	110-82-7	Prevent skin contact	8 hr: Nitrile, Viton, PE/EVAL, Barricade, Responder 4 hr: PVA, Teflon
Cyclohexanethiol	1569-69-3	Prevent skin contact	Contact the manufacturer for recommendations
Cyclohexanol	108-93-0	Prevent skin contact	8 hr: Butyl, Nitrile, PVA, Teflon, Viton 4 hr: Neoprene, PVC, PE/EVAL
Cyclohexanone	108-94-1	Prevent skin contact	8 hr: Butyl, PE/EVAL 4 hr: PVA
Cyclohexene	110-83-8	Prevent skin contact	Contact the manufacturer for recommendations
Cyclohexylamine	108-91-8	Prevent skin contact	8 hr: Responder
Cyclonite	121-82-4	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection ¹	Recommended protective clothing barriers ²
Cyclopentadiene	542-92-7	Prevent skin contact	Contact the manufacturer for recommendations
Cyclopentane	287-92-3	Prevent skin contact	Contact the manufacturer for recommendations
Cyhexatin	13121-70-5	Prevent skin contact	Contact the manufacturer for recommendations
2,4-D	94-75-7	Prevent skin contact	8 hr: Natural, Neoprene, Nitrile, PVC
DDT	50-29-3	Prevent skin contact	(No longer manufactured) Any barrier that will prevent contamination from the dry chemical
Decaborane	17702-41-9	Prevent skin contact	Any barrier that will prevent contamination from the dry chemical
1-Decanethiol	143-10-2	Prevent skin contact	Contact the manufacturer for recommendations
Demeton	8065-48-3	Prevent skin contact	Contact the manufacturer for recommendations
Diacetone alcohol	123-42-2	Prevent skin contact	8 hr: Butyl 4 hr: Neoprene, PE/EVAL
2,4-Diaminoanisole (and its salts)	615-05-4	Prevent skin contact	Contact the manufacturer for recommendations
o-Dianisidine	119-90-4	Prevent skin contact	Contact the manufacturer for recommendations
Diazinon®	333-41-5	Prevent skin contact	Contact the manufacturer for recommendations
Diazomethane	334-88-3	Frostbite	Prevent possible skin freezing from direct liquid contact
Diborane	19287-45-7	N.R.	Determine based on working conditions
1,2-Dibromo-3-chloro-propane	96-12-8	Prevent skin contact	Contact the manufacturer for recommendations
2-N-Dibutylaminoethanol	102-81-8	Prevent skin contact	Contact the manufacturer for recommendations
Dibutyl phosphate	107-66-4	Prevent skin contact	Contact the manufacturer for recommendations
Dibutyl phthalate	84-74-2	Prevent skin contact	8 hr: Butyl, Nitrile, PVA, Viton 4 hr: PE/EVAL

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Dichloroacetylene	7572-29-4	Prevent skin contact	Contact the manufacturer for recommendations
o-Dichlorobenzene	95-50-1	Prevent skin contact	4 hr: Viton, PE/EVAL
p-Dichlorobenzene	106-46-7	Prevent skin contact	Contact the manufacturer for recommendations
3,3'-Dichlorobenzidine (and its salts)	91-94-1	Prevent skin contact	Contact the manufacturer for recommendations
Dichlorodifluoromethane	75-71-8	Frostbite	Prevent possible skin freezing from direct liquid contact
1,3-Dichloro-5,5-dimethylhydantoin	118-52-5	Prevent skin contact	Contact the manufacturer for recommendations
1,1-Dichloroethane	75-34-3	Prevent skin contact	8 hr: Tychem
1,2-Dichloroethylene	540-59-0	Prevent skin contact	8 hr: Teflon, Viton, PE/EVAL, Barricade, CPF3, Responder, Tychem 4 hr: PVA
Dichloroethyl ether	111-44-4	Prevent skin contact	8 hr: Tychem 4 hr: Teflon
Dichloromonofluoromethane	75-43-4	Frostbite	Prevent possible skin freezing from direct liquid contact
1,1-Dichloro-1-nitroethane	594-72-9	Prevent skin contact	Contact the manufacturer for recommendations
1,3-Dichloropropene	542-75-6	Prevent skin contact	8 hr: PVA, Viton, Responder 4 hr: Teflon
2,2-Dichloropropionic acid	75-99-0	Prevent skin contact	Contact the manufacturer for recommendations
Dichlorotetrafluoroethane	76-14-2	Frostbite	Prevent possible skin freezing from direct liquid contact
Dichlorvos	62-73-7	Prevent skin contact	Contact the manufacturer for recommendations
Dicrotophos	141-66-2	Prevent skin contact	Contact the manufacturer for recommendations
Dicyclopentadiene	77-73-6	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Dicyclopentadienyl iron	102-54-5	N.R.	Determine based on working conditions
Dieldrin	60-57-1	Prevent skin contact	Contact the manufacturer for recommendations
Diesel exhaust		N.R.	Determine based on working conditions
Diethanolamine	111-42-2	Prevent skin contact	8 hr: Butyl, Neoprene, Nitrile, PVC, Viton, CPF3, Responder 4 hr: Natural, Teflon, PE/EVAL
Diethylamine	109-89-7	Prevent skin contact	Contact the manufacturer for recommendations
2-Diethylaminoethanol	100-37-8	Prevent skin contact	8 hr: Butyl, Nitrile, PVA, Viton
Diethylenetriamine	111-40-0	Prevent skin contact	8 hr: Butyl, Neoprene, Viton, Tychem 4 hr: PE/EVAL
Diethyl ketone	96-22-0	N.R.	Determine based on working conditions
Diethyl phthalate	84-66-2	Prevent skin contact	4 hr: PE/EVAL
Difluorodibromomethane	75-61-6	Prevent skin contact	Contact the manufacturer for recommendations
Diglycidyl ether	2238-07-5	Prevent skin contact	Contact the manufacturer for recommendations
Diisobutyl ketone	108-83-8	Prevent skin contact	4 hr: PVA, PE/EVAL
Diisopropylamine	108-18-9	Prevent skin contact	8 hr: Teflon, Viton
Dimethyl acetamide	127-19-5	Prevent skin contact	8 hr: Butyl, PE/EVAL, Barricade, CPF3, Responder, Tychem 4 hr: Teflon
Dimethylamine	124-40-3	Prevent skin contact	8 hr: Butyl, Neoprene 4 hr: Teflon, PE/EVAL
4-Dimethylamino-azobenzene	60-11-7	Prevent skin contact	Contact the manufacturer for recommendations
bis(2-(Dimethylamino)ethyl)ether	3033-62-3	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Dimethylaminopropionitrile	1738-25-6	Prevent skin contact	Contact the manufacturer for recommendations
N,N-Dimethylaniline	121-69-7	Prevent skin contact	8 hr: Tychem 4 hr: PE/EVAL
Dimethyl carbamoyl chloride	79-44-7	Prevent skin contact	Contact the manufacturer for recommendations
Dimethyl-1,2-dibromo-2,2-dichlorethyl phosphate	300-76-5	Prevent skin contact	Contact the manufacturer for recommendations
Dimethylformamide	68-12-2	Prevent skin contact	8 hr: Butyl, Teflon, PE/EVAL, CPF3, Responder, Trelchem, Tychem
1,1-Dimethylhydrazine	57-14-7	Prevent skin contact	8 hr: Butyl, Barricade, Responder, Trelchem, Tychem
Dimethylphthalate	131-11-3	N.R.	Determine based on working conditions
Dimethyl sulfate	77-78-1	Prevent skin contact	8 hr: Barricade, Responder, Tychem 4 hr: Butyl, PE/EVAL
Dinitolmide	148-01-6	Prevent skin contact	Contact the manufacturer for recommendations
o-Dinitrobenzene	528-29-0	Prevent skin contact	Contact the manufacturer for recommendations
m-Dinitrobenzene	99-65-0	Prevent skin contact	Contact the manufacturer for recommendations
p-Dinitrobenzene	100-25-4	Prevent skin contact	Contact the manufacturer for recommendations
Dinitro-o-cresol	534-52-1	Prevent skin contact	Contact the manufacturer for recommendations
Dinitrotoluene	25321-14-6	Prevent skin contact	Contact the manufacturer for recommendations
Di-sec octyl phthalate	117-81-7	N.R.	Determine based on working conditions
Dioxane	123-91-1	Prevent skin contact	8 hr: PE/EVAL, Tychem 4 hr: Butyl, Teflon
Dioxathion	78-34-2	Prevent skin contact	Contact the manufacturer for recommendations
Diphenyl	92-52-4	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Diphenylamine	122-39-4	Prevent skin contact	Contact the manufacturer for recommendations
Dipropylene glycol methyl ether	34590-94-8	N.R.	Determine based on working conditions
Dipropyl ketone	123-19-3	Prevent skin contact	Contact the manufacturer for recommendations
Diquat (Diquat dibromide)	85-00-7	Prevent skin contact	4 hr: PE/EVAL
Disulfiram	97-77-8	Prevent skin contact	Contact the manufacturer for recommendations
Disulfoton	298-04-4	Prevent skin contact	Contact the manufacturer for recommendations
2,6-Di-tert-butyl-p-cresol	128-37-0	Prevent skin contact	Contact the manufacturer for recommendations
Diuron	330-54-1	Prevent skin contact	Contact the manufacturer for recommendations
Divinyl benzene	1321-74-0 (mixed isomers)	Prevent skin contact	8 hr: PVA, Viton
1-Dodecanethiol	112-55-0	Prevent skin contact	Contact the manufacturer for recommendations
Emery	12415-34-8 (emery) 1302-74-5 (corundum)	N.R.	Determine based on working conditions
Endosulfan	115-29-7	Prevent skin contact	Contact the manufacturer for recommendations
Endrin	72-20-8	Prevent skin contact	Contact the manufacturer for recommendations
Enflurane	13838-16-9	N.R.	Determine based on working conditions
Epichlorohydrin	106-89-8	Prevent skin contact	8 hr: Butyl, Barricade, Trelchem, Tychem 4 hr: PE/EVAL, Responder
EPN	2104-64-5	Prevent skin contact	Contact the manufacturer for recommendations
Ethanolamine	141-43-5	Prevent skin contact	8 hr: Butyl, Neoprene, Nitrile, Viton, PE/EVAL, Tychem 4 hr: PVC

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Ethion	563-12-2	Prevent skin contact	4 hr: Teflon
2-Ethoxyethanol	110-80-5	Prevent skin contact	8 hr: Butyl, Saranex, Responder 4 hr: PE/EVAL
2-Ethoxyethyl acetate	111-15-9	Prevent skin contact	8 hr: Butyl, Barricade, Responder 4 hr: PVA, PE/EVAL
Ethyl acetate	141-78-6	Prevent skin contact	8 hr: PE/EVAL, Barricade, CPF3, Responder, Trelchem, Tychem 4 hr: PVA, Teflon
Ethyl acrylate	140-88-5	Prevent skin contact	8 hr: PVA, Teflon, Responder, Tychem 4 hr: Butyl, PE/EVAL
Ethyl alcohol	64-17-5	Prevent skin contact	8 hr: Butyl, Viton, PE/EVAL 4 hr: Neoprene, Teflon
Ethylamine	75-04-7	Prevent skin contact (liquid)	8 hr: Butyl 4 hr: Teflon, Responder
Ethyl benzene	100-41-4	Prevent skin contact	8 hr: Viton, Barricade, Responder, Tychem 4 hr: Teflon
Ethyl bromide	74-96-4	Prevent skin contact	Contact the manufacturer for recommendations
Ethyl butyl ketone	106-35-4	Prevent skin contact	Contact the manufacturer for recommendations
Ethyl chloride	75-00-3	Prevent skin contact (liquid)	4 hr: Teflon
Ethylene chlorohydrin	107-07-3	Prevent skin contact	8 hr: Butyl, Viton, PVA, Barricade 4 hr: PE/EVAL
Ethylenediamine	107-15-3	Prevent skin contact	8 hr: Butyl, Saranex, Responder 4 hr: Teflon

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Ethylene dibromide	106-93-4	Prevent skin contact	8 hr: PVA, Teflon, Viton, PE/EVAL, Barricade, Tychem
Ethylene dichloride	107-06-2	Prevent skin contact	8 hr: Teflon, Viton, PE/EVAL, Barricade, CPF3, Responder, Tychem 4 hr: PVA
Ethylene glycol	107-21-1	Prevent skin contact	8 hr: Butyl, Natural, Neoprene, Nitrile, PE, PVC, Teflon, Viton, Saranex, PE/EVAL, Trelchem 4 hr: Responder
Ethylene glycol dinitrate	628-96-6	Prevent skin contact	Contact the manufacturer for recommendations
Ethyleneimine	151-56-4	Prevent skin contact	8 hr: Butyl, Tychem 4 hr: Teflon, Responder
Ethylene oxide	75-21-8	Prevent skin contact (liquid)	8 hr: Barricade, Responder, Trelchem, Tychem 4 hr: Butyl, Teflon, PE/EVAL
Ethylene thiourea	96-45-7	Prevent skin contact	Contact the manufacturer for recommendations
Ethyl ether	60-29-7	Prevent skin contact	8 hr: PVA, PE/EVAL, Barricade 4 hr: Teflon, Responder, Trelchem
Ethyl formate	109-94-4	Prevent skin contact	Contact the manufacturer for recommendations
Ethylidene norbornene	16219-75-3	Prevent skin contact	Contact the manufacturer for recommendations
Ethyl mercaptan	75-08-1	Prevent skin contact	4 hr: Teflon
N-Ethylmorpholine	100-74-3	Prevent skin contact	Contact the manufacturer for recommendations
Ethyl silicate	78-10-4	Prevent skin contact	Contact the manufacturer for recommendations
Fenamiphos	22224-92-6	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Fensulfothion	115-90-2	Prevent skin contact	Contact the manufacturer for recommendations
Fenthion	55-38-9	Prevent skin contact	Contact the manufacturer for recommendations
Ferbam	14484-64-1	Prevent skin contact	Contact the manufacturer for recommendations
Ferrovandium dust	12604-58-9	N.R.	Determine based on working conditions
Fibrous glass dust		Prevent skin contact	Any barrier that will prevent contamination from the dust and fiber
Fluorine	7782-41-4	Prevent skin contact (liquid)	8 hr: Barricade, Responder
Fluorotrichloromethane	75-69-4	Prevent skin contact	Contact the manufacturer for recommendations
Fluoroxene	406-90-6	N.R.	Determine based on working conditions
Fonofos	944-22-9	Prevent skin contact	Contact the manufacturer for recommendations
Formaldehyde	50-00-0	Prevent skin contact	Contact the manufacturer for recommendations
Formalin (as formaldehyde)		Prevent skin contact	8 hr: Butyl, Nitrile, Viton, Saranex, Barricade, CPF3 4 hr: Teflon, PE/EVAL, Responder
Formamide	75-12-7	N.R.	Determine based on working conditions
Formic acid	64-18-6	Prevent skin contact	8 hr: Butyl, Neoprene, Saranex, Barricade, Responder, Trelchem 4 hr: PVC, Teflon
Furfural	98-01-1	Prevent skin contact	8 hr: Butyl, PE/EVAL, Barricade, CPF3, Trelchem, Tychem 4 hr: PVA, Saranex
Furfuryl alcohol	98-00-0	Prevent skin contact	8 hr: PE/EVAL

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Gasoline	8006-61-9	Prevent skin contact	8 hr: Nitrile, Viton, Barricade 4 hr: PVA, PE/EVAL, Responder
Germanium tetrahydride	7782-65-2	N.R.	Determine based on working conditions
Glutaraldehyde	111-30-8	Prevent skin contact	8 hr: Butyl, Viton 4 hr: Natural, Neoprene, Nitrile, PVC
Glycerin (mist)	56-81-5	Prevent skin contact	8 hr: Natural, Neoprene, Nitrile 4 hr: PE/EVAL
Glycidol	556-52-5	Prevent skin contact	Contact the manufacturer for recommendations
Glycolonitrile	107-16-4	Prevent skin contact	Contact the manufacturer for recommendations
Grain dust (oat, wheat, barley)		N.R.	Determine based on working conditions
Graphite (natural)	7782-42-5	N.R.	Determine based on working conditions
Graphite (synthetic)	7440-44-0 (synthetic)	N.R.	Determine based on working conditions
Gypsum	13397-24-5	N.R.	Determine based on working conditions
Hafnium	7440-58-6	Prevent skin contact	Contact the manufacturer for recommendations
Halothane	151-67-7	Prevent skin contact	8 hr: PVA
Heptachlor	76-44-8	Prevent skin contact	Contact the manufacturer for recommendations
n-Heptane	142-82-5	Prevent skin contact	8 hr: Nitrile, Viton, PE/EVAL
1-Heptanethiol	1639-09-4	Prevent skin contact	Contact the manufacturer for recommendations
Hexachlorobutadiene	87-68-3	Prevent skin contact	8 hr: Responder, Tychem
Hexachlorocyclopentadiene	77-47-4	Prevent skin contact	8 hr: Butyl, Nitrile, PVA, Viton, Responder
Hexachloroethane	67-72-1	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Hexachloronaphthalene	1335-87-1	Prevent skin contact	Contact the manufacturer for recommendations
1-Hexadecanethiol	2917-26-2	Prevent skin contact	Contact the manufacturer for recommendations
Hexafluoroacetone	684-16-2	Prevent skin contact/Frostbite	Contact the manufacturer for recommendations
Hexamethylene diisocyanate	822-06-0	Prevent skin contact	8 hr: Saranex, Barricade, Responder
Hexamethyl phosphoramidate	680-31-9	Prevent skin contact	Contact the manufacturer for recommendations
n-Hexane	110-54-3	Prevent skin contact	8 hr: Nitrile, PVA, Teflon, Viton, PE/EVAL, CPF3, Responder, Trelchem, Tychem 4 hr: Barricade
Hexane isomers (excluding n-Hexane)		Prevent skin contact	Contact the manufacturer for recommendations
n-Hexanethiol	111-31-9	Prevent skin contact	Contact the manufacturer for recommendations
2-Hexanone	591-78-6	Prevent skin contact	Contact the manufacturer for recommendations
Hexone	108-10-1	Prevent skin contact	Contact the manufacturer for recommendations
sec-Hexyl acetate	108-84-9	Prevent skin contact	Contact the manufacturer for recommendations
Hexylene glycol	107-41-5	Prevent skin contact	Contact the manufacturer for recommendations
Hydrazine	302-01-2	Prevent skin contact	8 hr: Butyl, Neoprene, Nitrile, PVC, Teflon, Saranex, Barricade, Responder 4 hr: PE/EVAL
Hydrogenated terphenyls	61788-32-7	Prevent skin contact	Contact the manufacturer for recommendations
Hydrogen bromide	10035-10-6	Prevent skin contact (solution)/ Frostbite	4 hr: Teflon Prevent possible skin freezing from direct liquid contact

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [†]
Hydrogen chloride	7647-01-0	Prevent skin contact (solution)/ Frostbite	8hr: Butyl, Teflon, Saranex, Barricade, Responder, Trelchem, Tychem 4 hr: Neoprene, PVC Prevent possible skin freezing from direct liquid contact
Hydrogen cyanide	74-90-8	Prevent skin contact	8 hr: Teflon 4 hr: PE/EVAL, Responder, Tychem
Hydrogen fluoride (as F)	7664-39-3	Prevent skin contact (liquid)	8 hr: Tychem 4 hr: Teflon
Hydrogen peroxide	7722-84-1	Prevent skin contact	(solution 30%-70%) 8 hr: Butyl, Natural, Nitrile, PE, Viton, CPF3, Responder, Tychem 4 hr: PVC, PE/EVAL
Hydrogen selenide	7783-07-5	Frostbite	Prevent possible skin freezing from direct liquid contact
Hydrogen sulfide	7783-06-4	Prevent skin contact/ Frostbite	8 hr: Tychem 4 hr: Teflon Prevent possible skin freezing from direct liquid contact
Hydroquinone	123-31-9	Prevent skin contact	4 hr: Natural, Neoprene, Nitrile, PVC, PE/EVAL
2-Hydroxypropyl acrylate	999-61-1	Prevent skin contact	Contact the manufacturer for recommendations
Indene	95-13-6	Prevent skin contact	Contact the manufacturer for recommendations
Indium	7440-74-6	N.R.	Determine based on working conditions
Iodine	7553-56-2	Prevent skin contact	8 hr: Saranex 4 hr: PE
Iodoform	75-47-8	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Iron oxide dust and fume (as Fe)	1309-37-1	N.R.	Determine based on working conditions
Iron pentacarbonyl (as Fe)	13463-40-6	Prevent skin contact	Contact the manufacturer for recommendations
Iron salts (soluble, as Fe)		Prevent skin contact	Contact the manufacturer for recommendations for the specific compound
Isoamyl acetate	123-92-2	Prevent skin contact	Contact the manufacturer for recommendations
Isoamyl alcohol (primary)	123-51-3	Prevent skin contact	8 hr: Butyl, Neoprene, Nitrile, Viton
Isoamyl alcohol (secondary)	528-75-4	Prevent skin contact	Contact the manufacturer for recommendations
Isobutane	75-28-5	Frostbite	Prevent possible skin freezing from direct liquid contact
Isobutyl acetate	110-19-0	Prevent skin contact	Contact the manufacturer for recommendations
Isobutyl alcohol	78-83-1	Prevent skin contact	8 hr: Butyl, Neoprene, Viton, Responder 4 hr: Nitrile, PE/EVAL
Isobutyronitrile	78-82-0	Prevent skin contact	4 hr: Teflon
Isooctyl alcohol	26952-21-6	Prevent skin contact	Contact the manufacturer for recommendations
Isophorone	78-59-1	Prevent skin contact	8 hr: Responder 4 hr: PVA, PE/EVAL
Isophorone diisocyanate	4098-71-9	Prevent skin contact	8 hr: Butyl, Nitrile, PVA, Viton, Responder
2-Isopropoxyethanol	109-59-1	Prevent skin contact	Contact the manufacturer for recommendations
Isopropyl acetate	108-21-4	Prevent skin contact	Contact the manufacturer for recommendations
Isopropyl alcohol	67-63-0	Prevent skin contact	8 hr: Butyl, Nitrile, Viton, PE/EVAL, CPF3, Responder 4 hr: Neoprene, Teflon
Isopropylamine	75-31-0	Prevent skin contact	8 hr: Tychem 4 hr: Teflon

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
N-Isopropylaniline	768-52-5	Prevent skin contact	Contact the manufacturer for recommendations
Isopropyl ether	108-20-3	Prevent skin contact	Contact the manufacturer for recommendations
Isopropyl glycidyl ether	4016-14-2	Prevent skin contact	Contact the manufacturer for recommendations
Kaolin	1332-58-7	N.R.	Determine based on working conditions
Kepone	143-50-0	Prevent skin contact	Contact the manufacturer for recommendations
Kerosene	8008-20-6	Prevent skin contact	8 hr: Nitrile, PE, Viton 4 hr: Neoprene, PVA, PVC, Barricade, Responder
Ketene	463-51-4	N.R.	Determine based on working conditions
Lead	7439-92-1	Prevent skin contact	Any barrier that will prevent contamination from the dust
Limestone	1317-65-3	N.R.	Determine based on working conditions
Lindane	58-89-9	Prevent skin contact	Contact the manufacturer for recommendations
Lithium hydride	7580-67-8	Prevent skin contact	Contact the manufacturer for recommendations
L.P.G.	68476-85-7	Frostbite	Prevent possible skin freezing from direct liquid contact
Magnesite	546-93-0	N.R.	Determine based on working conditions
Magnesium oxide fume	1309-48-4	N.R.	Determine based on working conditions
Malathion	121-75-5	Prevent skin contact	4 hr: Teflon, PE/EVAL
Maleic anhydride	108-31-6	Prevent skin contact	8 hr: Responder
Malonaldehyde	542-78-9	Prevent skin contact	Contact the manufacturer for recommendations
Malononitrile	109-77-3	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Manganese compounds and fume (as Mn)	7439-96-5 (metal)	N.R.	Determine based on working conditions
Manganese cyclopentadienyl tricarbonyl (as Mn)	12079-65-1	Prevent skin contact	Contact the manufacturer for recommendations
Manganese tetroxide (as Mn)	1317-35-7	N.R.	Determine based on working conditions
Marble	1317-65-3	N.R.	Determine based on working conditions
Mercury compounds [except (organo) alkyls] (as Hg)	7439-97-6 (metal)	Prevent skin contact	Contact the manufacturer for recommendations for the specific compound
Mercury (organo) alkyl compounds (as Hg)		Prevent skin contact	Contact the manufacturer for recommendations for the specific compound
Mesityl oxide	141-79-7	Prevent skin contact	8 hr: Responder
Methacrylic acid	79-41-4	Prevent skin contact	8 hr: Butyl, Viton, PE/EVAL, REsponder, Tychem
Methomyl	16752-77-5	Prevent skin contact	8 hr: Tychem
Methoxychlor	72-43-5	Prevent skin contact	Contact the manufacturer for recommendations
Methoxyflurane	76-38-0	N.R.	Determine based on working conditions
4-Methoxyphenol	150-76-5	Prevent skin contact	Contact the manufacturer for recommendations
Methyl acetate	79-20-9	Prevent skin contact	8 hr: PE/EVAL 4 hr: Teflon
Methyl acetylene	74-99-7	Frostbite	Prevent possible skin freezing from direct liquid contact
Methyl acetylene-propadiene mixture	59355-75-8	Frostbite	Prevent possible skin freezing from direct liquid contact
Methyl acrylate	96-33-3	Prevent skin contact	8 hr: Butyl, Tychem 4 hr: Teflon
Methylacrylonitrile	126-98-7	Prevent skin contact	Contact the manufacturer for recommendations
Methylal	109-87-5	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Methyl alcohol	67-56-1	Prevent skin contact	8 hr: Butyl, Teflon, Viton, Saranex, PE/EVAL, Responder, Trelchem, Tychem
Methylamine	74-89-5	Prevent skin contact (solution)/ Frostbite	8 hr: Responder, Tychem 4 hr: Teflon Prevent possible skin freezing from direct liquid contact
Methyl (n-amyl) ketone	110-43-0	Prevent skin contact	4 hr: PE/EVAL
Methyl bromide	74-83-9	Prevent skin contact (liquid)	8 hr: Responder, Tychem 4 hr: Butyl, Neoprene, Teflon
Methyl Cellosolve®	109-86-4	Prevent skin contact	8 hr: Butyl, Tychem 4 hr: PE/EVAL
Methyl Cellosolve® acetate	110-49-6	Prevent skin contact	8 hr: Butyl, Tychem 4 hr: Saranex, PE/EVAL
Methyl chloride	74-87-3	Prevent skin contact/ Frostbite	8 hr: Viton, Saranex, Barricade, Responder, Trelchem, Tychem 4 hr: Teflon Prevent possible skin freezing from direct liquid contact
Methyl chloroform	71-55-6	Prevent skin contact	8 hr: PVA, Viton, PE/EVAL, Barricade, CPF3, Responder, Tychem 4 hr: Teflon
Methyl-2-cyanoacrylate	137-05-3	Prevent skin contact	Contact the manufacturer for recommendations
Methylcyclohexane	108-87-2	Prevent skin contact	Contact the manufacturer for recommendations
Methylcyclohexanol	25639-42-3	Prevent skin contact	Contact the manufacturer for recommendations
o-Methylcyclohexanone	583-60-8	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Methyl cyclopentadienyl manganese tricarbonyl (as Mn)	12108-13-3	Prevent skin contact	Contact the manufacturer for recommendations
Methyl demeton	8022-00-2	Prevent skin contact	Contact the manufacturer for recommendations
4,4'-Methylenebis(2-chloroaniline)	101-14-4	Prevent skin contact	8 hr: Saranex, Barricade 4 hr: PE/EVAL
Methylene bis(4-cyclohexylisocyanate)	5124-30-1	Prevent skin contact	Contact the manufacturer for recommendations
Methylene bisphenyl isocyanate	101-68-8	Prevent skin contact	8 hr: PE/EVAL, Barricade, Responder
Methylene chloride	75-09-2	Prevent skin contact	8 hr: PVA, PE/EVAL, Responder, Trelchem, Tychem 4 hr: Teflon, Barricade
4,4'-Methylenedianiline	101-77-9	Prevent skin contact	8 hr: PE/EVAL
Methyl ethyl ketone peroxide	1338-23-4	Prevent skin contact	Contact the manufacturer for recommendations
Methyl formate	107-31-3	Prevent skin contact	Contact the manufacturer for recommendations
5-Methyl-3-heptanone	541-85-5	Prevent skin contact	Contact the manufacturer for recommendations
Methyl hydrazine	60-34-4	Prevent skin contact	8 hr: Responder, Tychem
Methyl iodide	74-88-4	Prevent skin contact	8 hr: Viton, Responder, Tychem
Methyl isoamyl ketone	110-12-3	Prevent skin contact	Contact the manufacturer for recommendations
Methyl isobutyl carbinol	108-11-2	Prevent skin contact	Contact the manufacturer for recommendations
Methyl isocyanate	624-83-9	Prevent skin contact	8 hr: PVA, Barricade, Responder, Trelchem, Tychem
Methyl isopropyl ketone	563-80-4	Prevent skin contact	Contact the manufacturer for recommendations
Methyl mercaptan	74-93-1	Prevent skin contact (liquid)/ Frostbite	8 hr: Barricade, Responder, Tychem Prevent possible skin freezing from direct liquid contact

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Methyl methacrylate	80-62-6	Prevent skin contact	8 hr: PVA, PE/EVAL, Barricade, Trellchem 4 hr: Teflon
Methyl parathion	298-00-0	Prevent skin contact	Contact the manufacturer for recommendations
Methyl silicate	681-84-5	Prevent skin contact	Contact the manufacturer for recommendations
α -Methyl styrene	98-83-9	Prevent skin contact	Contact the manufacturer for recommendations
Metribuzin	21087-64-9	Prevent skin contact	Contact the manufacturer for recommendations
Mica (containing less than 1% quartz)	12001-26-2	N.R.	Determine based on working conditions
Mineral wool fiber		Prevent skin contact	Any barrier that will prevent contamination from the dust and fiber
Molybdenum	7439-98-7	N.R.	Determine based on working conditions
Molybdenum (soluble compounds, as Mo)		Prevent skin contact	Contact the manufacturer for recommendations for specific compounds
Monocrotophos	6923-22-4	Prevent skin contact	Contact the manufacturer for recommendations
Monomethyl aniline	100-61-8	Prevent skin contact	Contact the manufacturer for recommendations
Morpholine	110-91-8	Prevent skin contact	8 hr: Butyl, PE/EVAL
Naphtha (coal tar)	8030-30-6	Prevent skin contact	8 hr: Viton 4 hr: Nitrile, PVA
Naphthalene	91-20-3	Prevent skin contact	8 hr: Teflon
Naphthalene diisocyanate	3173-72-6	Prevent skin contact	Contact the manufacturer for recommendations
α -Naphthylamine	134-32-7	Prevent skin contact	Contact the manufacturer for recommendations
β -Naphthylamine	91-59-8	Prevent skin contact	Contact the manufacturer for recommendations
Niax [®] Catalyst ESN	62765-93-9	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection ¹	Recommended protective clothing barriers ²
Nickel carbonyl	13463-39-3	Prevent skin contact	8 hr: Tychem
Nickel metal and other compounds (as Ni)	7440-02-0 (Metal)	Prevent skin contact	Contact the manufacturer for recommendations for specific compounds
Nicotine	54-11-5	Prevent skin contact	8 hr: Barricade, CPF3, Responder 4 hr: Teflon, PE/EVAL
Nitric acid	7697-37-2	Prevent skin contact	(< 70% only) 8 hr: Butyl, Viton, Saranex, Barricade, CPF3, Trelchem, Tychem 4 hr: Neoprene, PE, PE/EVAL, Responder
Nitric oxide	10102-43-9	N.R.	Determine based on working conditions
p-Nitroaniline	100-01-6	Prevent skin contact	Contact the manufacturer for recommendations
Nitrobenzene	98-95-3	Prevent skin contact	8 hr: Butyl, PVA, Teflon, Viton, PE/EVAL, Barricade, CPF3, Responder, Trelchem, Tychem
4-Nitrobiphenyl	92-93-3	Prevent skin contact	Contact the manufacturer for recommendations
p-Nitrochlorobenzene	100-00-5	Prevent skin contact	4 hr: Saranex
Nitroethane	79-24-3	Prevent skin contact	8 hr: Butyl, PE/EVAL, Barricade 4 hr: Teflon
Nitrogen dioxide	10102-44-0	Prevent skin contact	8 hr: Saranex
Nitrogen trifluoride	7783-54-2	N.R.	Determine based on working conditions
Nitroglycerine	55-63-0	Prevent skin contact	4 hr: PE/EVAL
Nitromethane	75-52-5	Prevent skin contact	8 hr: Butyl, Teflon, PE/EVAL, Barricade, Responder, Trelchem 4 hr: PVA

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
2-Nitronaphthalene	581-89-5	Prevent skin contact	Contact the manufacturer for recommendations
1-Nitropropane	108-03-2	Prevent skin contact	8 hr: Butyl, PVA
2-Nitropropane	79-46-9	Prevent skin contact	8 hr: Butyl, PVA, Tychem 4 hr: Teflon, PE/EVAL
N-Nitrosodimethylamine	62-75-9	Prevent skin contact	Contact the manufacturer for recommendations
o-Nitrotoluene	88-72-2	Prevent skin contact	8 hr: Butyl 4 hr: Teflon, Saranex
m-Nitrotoluene	99-08-1	Prevent skin contact	Contact the manufacturer for recommendations
p-Nitrotoluene	99-99-0	Prevent skin contact	Contact the manufacturer for recommendations
Nitrous oxide	10024-97-2	Frostbite	Prevent possible skin freezing from direct liquid contact
Nonane	111-84-2	N.R.	Determine based on working conditions
1-Nonanethiol	1455-21-6	Prevent skin contact	Contact the manufacturer for recommendations
Octachloronaphthalene	2234-13-1	Prevent skin contact	Contact the manufacturer for recommendations
1-Octadecanethiol	2885-00-9	Prevent skin contact	Contact the manufacturer for recommendations
Octane	111-65-9	Prevent skin contact	8 hr: Responder, Tychem 4 hr: Nitrile, Viton
1-Octanethiol	111-88-6	Prevent skin contact	Contact the manufacturer for recommendations
Oil mist (mineral)	8012-95-1	Prevent skin contact	Contact the manufacturer for recommendations
Osmium tetroxide	20816-12-0	Prevent skin contact	Contact the manufacturer for recommendations
Oxalic acid	144-62-7	Prevent skin contact	8 hr: Butyl, Natural, Neoprene, Nitrile, PVC, Viton
Oxygen difluoride	7783-41-7	N.R.	Determine based on working conditions

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Ozone	10028-15-6	N.R.	Determine based on working conditions
Paraffin wax fume	8002-74-2	N.R.	Determine based on working conditions
Paraquat (Paraquat dichloride)	1910-42-5	Prevent skin contact	Contact the manufacturer for recommendations
Parathion	56-38-2	Prevent skin contact	8 hr: Tychem 4 hr: Teflon
Particulates not otherwise regulated		N.R.	Determine based on working conditions
Pentaborane	19624-22-7	Prevent skin contact	Contact the manufacturer for recommendations
Pentachloroethane	76-01-7	Prevent skin contact	Contact the manufacturer for recommendations
Pentachloronaphthalene	1321-64-8	Prevent skin contact	Contact the manufacturer for recommendations
Pentachlorophenol	87-86-5	Prevent skin contact	8 hr: Nitrile, Viton 4 hr: Neoprene, PE/EVAL
Pentaerythritol	115-77-5	N.R.	Determine based on working conditions
n-Pentane	109-66-0	Prevent skin contact	8 hr: Viton, PE/EVAL 4 hr: Nitrile, PVA
1-Pentanethiol	110-66-7	Prevent skin contact	Contact the manufacturer for recommendations
2-Pentanone	107-87-9	Prevent skin contact	4 hr: Butyl
Perchloromethyl mercaptan	594-42-3	Prevent skin contact	Contact the manufacturer for recommendations
Perchloryl fluoride	7616-94-6	Frostbite	Prevent possible skin freezing from direct liquid contact
Perlite	93763-70-3	N.R.	Determine based on working conditions
Petroleum distillates (naphtha)	8002-05-9	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Ozone	10028-15-6	N.R.	Determine based on working conditions
Paraffin wax fume	8002-74-2	N.R.	Determine based on working conditions
Paraquat (Paraquat dichloride)	1910-42-5	Prevent skin contact	Contact the manufacturer for recommendations
Parathion	56-38-2	Prevent skin contact	8 hr: Tychem 4 hr: Teflon
Particulates not otherwise regulated		N.R.	Determine based on working conditions
Pentaborane	19624-22-7	Prevent skin contact	Contact the manufacturer for recommendations
Pentachloroethane	76-01-7	Prevent skin contact	Contact the manufacturer for recommendations
Pentachloronaphthalene	1321-64-8	Prevent skin contact	Contact the manufacturer for recommendations
Pentachlorophenol	87-86-5	Prevent skin contact	8 hr: Nitrile, Viton 4 hr: Neoprene, PE/EVAL
Pentaerythritol	115-77-5	N.R.	Determine based on working conditions
n-Pentane	109-66-0	Prevent skin contact	8 hr: Viton, PE/EVAL 4 hr: Nitrile, PVA
1-Pentanethiol	110-66-7	Prevent skin contact	Contact the manufacturer for recommendations
2-Pentanone	107-87-9	Prevent skin contact	4 hr: Butyl
Perchloromethyl mercaptan	594-42-3	Prevent skin contact	Contact the manufacturer for recommendations
Perchloryl fluoride	7616-94-6	Frostbite	Prevent possible skin freezing from direct liquid contact
Perlite	93763-70-3	N.R.	Determine based on working conditions
Petroleum distillates (naphtha)	8002-05-9	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Phenol	108-95-2	Prevent skin contact	8 hr: Viton, Saranex, Barricade, Responder, Trelchem 4 hr: Butyl, Neoprene, Teflon, PE/EVAL
Phenothiazine	92-84-2	Prevent skin contact	Contact the manufacturer for recommendations
p-Phenylene diamine	106-50-3	Prevent skin contact	Contact the manufacturer for recommendations
Phenyl ether (vapor)	101-84-8	Prevent skin contact	Contact the manufacturer for recommendations
Phenyl ether-biphenyl mixture (vapor)	8004-13-5	Prevent skin contact	Contact the manufacturer for recommendations
Phenyl glycidyl ether	122-60-1	Prevent skin contact	Contact the manufacturer for recommendations
Phenylhydrazine	100-63-0	Prevent skin contact	Contact the manufacturer for recommendations
N-Phenyl-β-naphthylamine	135-88-6	Prevent skin contact	Contact the manufacturer for recommendations
Phenylphosphine	638-21-1	Prevent skin contact	Contact the manufacturer for recommendations
Phorate	298-02-2	Prevent skin contact	Contact the manufacturer for recommendations
Phosdrin	7786-34-7	Prevent skin contact	Contact the manufacturer for recommendations
Phosgene	75-44-5	Prevent skin contact (liquid)	8 hr: Responder, Tychem 4 hr: Teflon
Phosphine	7803-51-2	Prevent skin contact/ Frostbite	8 hr: Responder Prevent possible skin freezing from direct liquid contact
Phosphoric acid	7664-38-2	Prevent skin contact	8 hr: Butyl, Natural, Neoprene, Nitrile, PE, PVC, Viton, Saranex, PE/EVAL, Barricade, Responder, Trelchem
Phosphorus (yellow)	7723-14-0	Prevent skin contact* [*Note: Flame retardant equipment should be provided.]	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [†]
Phosphorus oxychloride	10025-87-3	Prevent skin contact	8 hr: Responder, Trelchem 4 hr: Teflon, PE/EVAL
Phosphorus pentachloride	10026-13-8	Prevent skin contact	Contact the manufacturer for recommendations
Phosphorus pentasulfide	1314-80-3	Prevent skin contact* [*Note: Flame retardant equipment should be provided]	Contact the manufacturer for recommendations
Phosphorus trichloride	7719-12-2	Prevent skin contact	8 hr: Barricade, Trelchem 4 hr: Teflon
Phthalic anhydride	85-44-9	Prevent skin contact	4 hr: PE/EVAL
m-Phthalodinitrile	626-17-5	Prevent skin contact	Contact the manufacturer for recommendations
Picloram	1918-02-1	Prevent skin contact	Contact the manufacturer for recommendations
Picric acid	88-89-1	Prevent skin contact	Contact the manufacturer for recommendations
Pindone	83-26-1	N.R.	Determine based on working conditions
Piperazine dihydrochloride	142-64-3	Prevent skin contact	Contact the manufacturer for recommendations
Plaster of Paris	26499-65-0	N.R.	Determine based on working conditions
Platinum	7440-06-4	N.R.	Determine based on working conditions
Platinum (soluble salts, as Pt)		Prevent skin contact	Contact the manufacturer for recommendations for specific compounds
Portland cement	65997-15-1	Prevent skin contact	Any barrier that will prevent contamination from the cement
Potassium cyanide (as CN)	151-50-8	Prevent skin contact	(solution <30% only) 8 hr: PE
Potassium hydroxide	1310-58-3	Prevent skin contact	(solution <70% only) 8 hr: Butyl, Natural, Nitrile, PVC, Viton 4 hr: Teflon, PE/EVAL

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Propane	74-98-6	Frostbite	Prevent possible skin freezing from direct liquid contact
Propane sultone	1120-71-4	Prevent skin contact	Contact the manufacturer for recommendations
1-Propanethiol	107-03-9	N.R.	Determine based on working conditions
Propargyl alcohol	107-19-7	Prevent skin contact	Contact the manufacturer for recommendations
β-Propiolactone	57-57-8	Prevent skin contact	4 hr: Teflon
Propionic acid	79-09-4	Prevent skin contact	4 hr: Teflon
Propionitrile	107-12-0	Prevent skin contact	8 hr: PVA
Propoxur	114-26-1	Prevent skin contact	Contact the manufacturer for recommendations
n-Propyl acetate	109-60-4	Prevent skin contact	8 hr: PE/EVAL
n-Propyl alcohol	71-23-8	Prevent skin contact	8 hr: Butyl, Nitrile, Viton 4 hr: Neoprene, PVA
Propylene dichloride	78-87-5	Prevent skin contact	Contact the manufacturer for recommendations
Propylene glycol dinitrate	6423-43-4	Prevent skin contact	Contact the manufacturer for recommendations
Propylene glycol monomethyl ether	107-98-2	Prevent skin contact	8 hr: Butyl 4 hr: Neoprene, PE/EVAL
Propylene imine	75-55-8	Prevent skin contact	Contact the manufacturer for recommendations
Propylene oxide	75-56-9	Prevent skin contact	8 hr: Barricade, Tychem 4 hr: Teflon, PE/EVAL, Responder
n-Propyl nitrate	627-13-4	Prevent skin contact	Contact the manufacturer for recommendations
Pyrethrum	8003-34-7	Prevent skin contact	Contact the manufacturer for recommendations
Pyridine	110-86-1	Prevent skin contact	8 hr: PE/EVAL, Responder, Tychem

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Quinone	106-51-4	Prevent skin contact	8 hr: Saranex
Resorcinol	108-46-3	Prevent skin contact	Contact the manufacturer for recommendations
Rhodium (metal fume and insoluble compounds, as Rh)	7440-16-6 (metal)	N.R.	Determine based on working conditions
Rhodium (soluble compounds, as Rh)		Prevent skin contact	Contact the manufacturer for recommendations for specific compound
Ronnel	299-84-3	Prevent skin contact	Contact the manufacturer for recommendations
Rosin core solder, pyrolysis products (as formaldehyde)		N.R.	Determine based on working conditions
Rotenone	83-79-4	Prevent skin contact	Contact the manufacturer for recommendations
Rouge	1309-37-1	N.R.	Determine based on working conditions
Selenium	7782-49-2	Prevent skin contact	Contact the manufacturer for recommendations
Selenium hexafluoride	7783-79-1	N.R.	Determine based on working conditions
Silica, amorphous	7631-86-9	N.R.	Determine based on working conditions
Silica, crystalline (as respirable dust)	14808-60-7	N.R.	Determine based on working conditions
Silicon	7440-21-3	N.R.	Determine based on working conditions
Silicon carbide	409-21-2	N.R.	Determine based on working conditions
Silicon tetrahydride	7803-62-5	N.R.	Determine based on working conditions
Silver (metal dust and soluble compounds, as Ag)	7440-22-4 (metal)	Prevent skin contact	Contact the manufacturer for recommendations for specific compound
Soapstone (containing less than 1% quartz)		N.R.	Determine based on working conditions
Sodium aluminum fluoride (as F)	15096-52-3	Prevent skin contact	Contact the manufacturer for recommendations
Sodium azide	26628-22-8	Prevent skin contact	Contact the manufacturer for recommendations
Sodium bisulfite	7631-90-5	N.R.	Determine based on working conditions

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Sodium cyanide (as CN)	143-33-9	Prevent skin contact	(solution > 70% only) 8 hr: Saranex, Barricade
Sodium fluoride (as F)	7681-49-4	Prevent skin contact	8 hr: Natural, Neoprene, Nitrile, PVC, Saranex
Sodium fluoroacetate	62-74-8	Prevent skin contact	Contact the manufacturer for recommendations
Sodium hydroxide	1310-73-2	Prevent skin contact	(solution > 70% only) 8 hr: Neoprene, PVC, Barricade
Sodium metabisulfite	7681-57-4	N.R.	Determine based on working conditions
Starch	9005-25-8	Prevent skin contact	Any barrier that will prevent skin contact
Stibine	7803-52-3	N.R.	Determine based on working conditions
Stoddard solvent	8052-41-3	Prevent skin contact	8 hr: Nitrile, Viton, Saranex, PE/EVAL, Barricade, Responder 4 hr: PVA
Strychnine	57-24-9	Prevent skin contact	Contact the manufacturer for recommendations
Styrene	100-42-5	Prevent skin contact	8 hr: Viton, PE/EVAL, Barricade, CPF3, Trelchem 4 hr: PVA, Teflon, Responder
Subtilisins	1395-21-7 (BPN) 9014-01-1 (Carlsburg)	Prevent skin contact	Contact the manufacturer for recommendations
Succinonitrile	110-61-2	Prevent skin contact	Contact the manufacturer for recommendations
Sucrose	57-50-1	N.R.	Determine based on working conditions
Sulfur dioxide	7446-09-5	Prevent skin contact/ Frostbite	8 hr: Saranex, Barricade, Responder 4 hr: Teflon Prevent possible skin freezing from direct liquid contact

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Sulfur hexafluoride	2551-62-4	Frostbite	Prevent possible skin freezing from direct liquid contact
Sulfuric acid	7664-93-9	Prevent skin contact	(solution > 70% only) 8 hr: Butyl, PE, Teflon, Saranex, PE/EVAL, Barricade, CPF3, Responder, Trelchem, Tychem 4 hr: Viton
Sulfur monochloride	10025-67-9	Prevent skin contact	Contact the manufacturer for recommendations
Sulfur pentafluoride	5714-22-7	Prevent skin contact	Contact the manufacturer for recommendations
Sulfur tetrafluoride	7783-60-0	Frostbite	Prevent possible skin freezing from direct liquid contact
Sulfuryl fluoride	2699-79-8	Frostbite	Prevent possible skin freezing from direct liquid contact
Sulprofos	35400-43-2	Prevent skin contact	Contact the manufacturer for recommendations
2,4,5-T	93-76-5	N.R.	Determine based on working conditions
Talc (containing no asbestos and less than 1% quartz)	14807-96-6	N.R.	Determine based on working conditions
Tantalum (metal and oxide dust, as Ta)	7440-25-7 (metal)	N.R.	Determine based on working conditions
TEDP	89-24-5	Prevent skin contact	Contact the manufacturer for recommendations
Tellurium	13494-80-9	N.R.	Determine based on working conditions
Tellurium hexafluoride	7783-80-4	N.R.	Determine based on working conditions
Temephos	3383-96-8	Prevent skin contact	Contact the manufacturer for recommendations
TEPP	107-49-3	Prevent skin contact	Contact the manufacturer for recommendations
o-Terphenyl	84-15-1	Prevent skin contact	Contact the manufacturer for recommendations
m-Terphenyl	92-06-8	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
p-Terphenyl	92-94-4	Prevent skin contact	Contact the manufacturer for recommendations
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	Prevent skin contact	Contact the manufacturer for recommendations
1,1,1,2-Tetrachloro-2,2-difluoroethane	76-11-9	Prevent skin contact	Contact the manufacturer for recommendations
1,1,2,2-Tetrachloro-1,2-difluoroethane	76-12-0	Prevent skin contact	Contact the manufacturer for recommendations
1,1,1,2-Tetrachloroethane	630-20-6	Prevent skin contact	8 hr: PVA, Viton
1,1,2,2-Tetrachloroethane	79-34-5	Prevent skin contact	8 hr: PVA, Teflon, Viton, Barricade, Tychem
Tetrachloroethylene	127-18-4	Prevent skin contact	8 hr: PVA, Teflon, Viton, PE/EVAL, Barricade, CPF3, Responder, Trelchem, Tychem
Tetrachloronaphthalene	1335-88-2	Prevent skin contact	Contact the manufacturer for recommendations
Tetraethyl lead (as Pb)	78-00-2	Prevent skin contact (>0.1%)	8 hr: CPF3, Tychem
Tetrahydrofuran	109-99-9	Prevent skin contact	8 hr: Teflon, PE/EVAL, Barricade, CPF3, Responder, Trelchem, Tychem
Tetramethyl lead (as Pb)	75-74-1	Prevent skin contact (>0.1%)	Contact the manufacturer for recommendations
Tetramethyl succinonitrile	3333-52-6	Prevent skin contact	Contact the manufacturer for recommendations
Tetranitromethane	509-14-8	Prevent skin contact	Contact the manufacturer for recommendations
Tetrasodium pyrophosphate	7722-88-5	Prevent skin contact	Contact the manufacturer for recommendations
Tetryl	479-45-8	Prevent skin contact	Contact the manufacturer for recommendations
Thallium (soluble compounds, as Tl)		Prevent skin contact	Contact the manufacturer for recommendations for the specific compound
4,4'-Thiobis(6-tert-butyl-m-cresol)	96-69-5	N.R.	Determine based on working conditions
Thioglycolic acid	68-11-1	Prevent skin contact	8 hr: Butyl, Neoprene, Viton 4 hr: PE/EVAL

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Thionyl chloride	7719-09-7	Prevent skin contact	Contact the manufacturer for recommendations
Thiram	137-26-8	Prevent skin contact	Contact the manufacturer for recommendations
Tin	7440-31-5	N.R.	Determine based on working conditions
Tin (organic compounds, as Sn)		Recommendations regarding personal protective clothing vary depending upon the specific compound.	Contact the manufacturer for recommendations for the specific compound
Tin(II) oxide (as Sn)	21651-19-4	N.R.	Determine based on working conditions
Tin(IV) oxide (as Sn)	18282-10-5	N.R.	Determine based on working conditions
Titanium dioxide	13463-67-7	N.R.	Determine based on working conditions
o-Tolidine	119-93-7	Prevent skin contact	Contact the manufacturer for recommendations
Toluene	108-88-3	Prevent skin contact	8 hr: PVA, Teflon, Viton, PE/EVAL, Barricade, CPF3, Responder, Trelchem, Tychem
Toluenediamine	25376-45-8 95-80-7 (2,4-TDA)	Prevent skin contact	Contact the manufacturer for recommendations
Toluene-2,4-diisocyanate	584-84-9	Prevent skin contact	8 hr: Butyl, Nitrile, PVA, PVC, Viton, Saranex, PE/EVAL, Barricade, CPF3, Responder 4 hr: Teflon
o-Toluidine	95-53-4	Prevent skin contact	8 hr: Barricade, Tychem 4 hr: Teflon, Saranex
m-Toluidine	108-44-1	Prevent skin contact	8 hr: Saranex
p-Toluidine	106-49-0	Prevent skin contact	Contact the manufacturer for recommendations
Tributyl phosphate	126-73-8	Prevent skin contact	4 hr: PE/EVAL

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
Trichloroacetic acid	76-03-9	Prevent skin contact	8 hr: Trelchem 4 hr: Nitrile
1,2,4-Trichlorobenzene	120-82-1	Prevent skin contact	8 hr: Teflon, Barricade 4 hr: Viton
1,1,2-Trichloroethane	79-00-5	Prevent skin contact	8 hr: Teflon, Viton, Tychem 4 hr: PVA
Trichloroethylene	79-01-6	Prevent skin contact	8 hr: PVA, Viton, PE/EVAL, Barricade, Trelchem, Tychem 4 hr: Teflon, Responder
Trichloronaphthalene	1321-65-9	Prevent skin contact	Contact the manufacturer for recommendations
1,2,3-Trichloropropane	96-18-4	Prevent skin contact	8 hr: Butyl, PVA, Viton
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	Prevent skin contact	8 hr: Nitrile, Teflon, Barricade, CPF3, Responder 4 hr: PVA, Viton, PE/EVAL
Triethylamine	121-44-8	Prevent skin contact	8 hr: Nitrile, Viton, Saranex, Responder, Trelchem, Tychem
Trifluorobromomethane	75-63-8	Frostbite	Prevent possible skin freezing from direct liquid contact
Trimellitic anhydride	552-30-7	Prevent skin contact	Contact the manufacturer for recommendations
Trimethylamine	75-50-3	Prevent skin contact (liquid)/ Frostbite	4 hr: Teflon Prevent possible skin freezing from direct liquid contact
1,2,3-Trimethylbenzene	526-73-8	Prevent skin contact	Contact the manufacturer for recommendations
1,2,4-Trimethylbenzene	95-63-6	Prevent skin contact	8 hr: PVA, Viton, PE/EVAL, Barricade, CPF3, Tychem 4 hr: Teflon, Responder

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
1,3,5-Trimethylbenzene	108-67-8	Prevent skin contact	Contact the manufacturer for recommendations
Trimethyl phosphite	121-45-9	Prevent skin contact	Contact the manufacturer for recommendations
2,4,6-Trinitrotoluene	118-96-7	Prevent skin contact	Contact the manufacturer for recommendations
Triorthocresyl phosphate	78-30-8	Prevent skin contact	Contact the manufacturer for recommendations
Triphenylamine	603-34-9	Prevent skin contact	Contact the manufacturer for recommendations
Triphenyl phosphate	115-86-6	N.R.	Determine based on working conditions
Tungsten	7440-33-7	N.R.	Determine based on working conditions
Tungsten (soluble compounds, as W)		Recommendations regarding personal protective clothing vary depending upon the specific compound.	Contact the manufacturer for recommendations for the specific compound
Tungsten carbide (cemented)	1: 11107-01-0 2: 12718-69-3 3: 37329-49-0	Prevent skin contact	Contact the manufacturer for recommendations
Turpentine	8006-64-2	Prevent skin contact	8 hr: Viton, PE/EVAL, Responder 4 hr: Nitrile, PVA, Teflon
1-Undecanethiol	5332-52-5	Prevent skin contact	Contact the manufacturer for recommendations
Uranium (insoluble compounds, as U)	7440-61-1 (metal)	Prevent skin contact	Contact the manufacturer for recommendations
Uranium (soluble compounds, as U)		Prevent skin contact	Contact the manufacturer for recommendations for specific compound
n-Valeraldehyde	110-62-3	Prevent skin contact	Contact the manufacturer for recommendations
Vanadium dust	1314-62-1	Prevent skin contact	Any barrier that will prevent contamination from the dust
Vanadium fume	1314-62-1	N.R.	Determine based on working conditions

Chemical	CAS No.	Recommendation for skin protection†	Recommended protective clothing barriers*
Vegetable oil mist	68956-68-3	N.R.	Determine based on working conditions
Vinyl acetate	108-05-4	Prevent skin contact	8 hr: Teflon, PE/EVAL, Barricade 4 hr: Responder
Vinyl bromide	593-60-2	Prevent skin contact (liquid)	Contact the manufacturer for recommendations
Vinyl chloride	75-01-4	Prevent skin contact/ Frostbite	8 hr: Tychem 4 hr: PVA, Teflon Prevent possible skin freezing from direct liquid contact
Vinyl cyclohexene dioxide	106-87-6	Prevent skin contact	Contact the manufacturer for recommendations
Vinyl fluoride	75-02-5	Frostbite	Prevent possible skin freezing from direct liquid contact
Vinylidene chloride	75-35-4	Prevent skin contact/ Frostbite	Contact the manufacturer for recommendations Prevent possible skin freezing from direct liquid contact
Vinylidene fluoride	75-38-7	Prevent skin contact/ Frostbite	8 hr: Butyl, Teflon, Viton Prevent possible skin freezing from direct liquid contact
Vinyl toluene	25013-15-4 (inhibited)	Prevent skin contact	Contact the manufacturer for recommendations
VM & P Naphtha	8032-32-4	Prevent skin contact	Contact the manufacturer for recommendations
Warfarin	81-81-2	Prevent skin contact	Contact the manufacturer for recommendations
Welding fumes		N.R.	Determine based on working conditions
Wood dust		N.R.	Determine based on working conditions
o-Xylene	95-47-6	Prevent skin contact	Contact the manufacturer for recommendations
m-Xylene	108-38-3	Prevent skin contact	Contact the manufacturer for recommendations

Chemical	CAS No.	Recommendation for skin protection [†]	Recommended protective clothing barriers [*]
p-Xylene	106-42-3	Prevent skin contact	Contact the manufacturer for recommendations
m-Xylene α,α' -diamine	1477-55-0	Prevent skin contact	Contact the manufacturer for recommendations
Xylidine	1300-73-8	Prevent skin contact	Contact the manufacturer for recommendations
Yttrium	7440-65-5	N.R.	Determine based on working conditions
Zinc chloride fume	7646-85-7	N.R.	Determine based on working conditions
Zinc oxide	1314-13-2	N.R.	Determine based on working conditions
Zinc stearate	557-05-1	N.R.	Determine based on working conditions
Zirconium compounds (as Zr)	7440-67-7 (Metal)	Recommendations regarding personal protective clothing vary depending upon the specific compound.	Contact the manufacturer for recommendations for the specific compound

Recommendations for skin protection[†]

Prevent skin contact....	Wear appropriate personal protective clothing to prevent skin contact. Suggested barriers for use should be confirmed with the vendor and for additional information and use limitations.
Frostbite.....	Wear appropriate personal protective clothing to prevent the skin from becoming frozen from contact with the evaporating liquid or from contact with vessels containing the liquid.
N.R.....	No specific recommendation can be made. Actual working conditions will determine the need and type of personal protective equipment.

[†]**Bold type** indicates a change from or an addition to what is published in the *NIOSH Pocket Guide to Chemical Hazards, June 1997 Edition*.

Recommended protective clothing barriers^{*}

Butyl = Butyl Rubber (Gloves, Suits, Boots)
 Natural = Natural Rubber (Gloves)
 Neoprene = Neoprene Rubber (Gloves, Suits, Boots)
 Nitrile = Nitrile Rubber (Gloves, Suits, Boots)
 PE = Polyethylene (Gloves, Suits, Boots)
 PVA = Polyvinyl Alcohol (Gloves)
 PVC = Polyvinyl Chloride (Gloves, Suits, Boots)
 Teflon = Teflon™ (Gloves, Suits, Boots)
 Viton = Viton™ (Gloves, Suits)
 Saranex = Saranex™ coated suits

PE/EVAL = 4H™ and Silver Shield™ brand gloves
Barricade = Barricade™ coated suits
CPF3 = CPF3™ suits
Responder = Responder™ suits
Trelchem = Trelchem HPS™ suits
Tychem = Tychem 10000™ suits

8 hr = More than 8 hours of resistance to breakthrough $>0.1 \mu\text{g}/\text{cm}^2/\text{min}$.

4 hr = At least 4 but less than 8 hours of resistance to breakthrough $>0.1 \mu\text{g}/\text{cm}^2/\text{min}$.

*Neoprene is a tradename and Teflon, Viton, Barricade and Tychem 10 000 are trademarks of the DuPont Company. Saranex is a tradename of the Dow Chemical Company. 4H is a trademark of the Safety 4 Company. Silver Shield is a trademark of the Siebe North Company. CPF3 and Responder are trademarks of the Kappler Company. Trelchem HPS is a trademark of the Trelleborg Company. Recommendations are NOT valid for very thin Natural Rubber, Neoprene, Nitrile, and PVC gloves (0.3 mm or less).