



# Lab Glove Selection Guide

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## Overview

The Lab Glove Selection Guide helps you choose gloves to protect your skin from chemical contact hazards. Use this guide along with agent-specific or process-specific standard operating procedures (SOP).



This guide addresses glove chemical protection and doesn't consider other performance factors such as puncture resistance, thermal protection, or cut protection. Consider appropriate contact protection for other skin areas when choosing gloves.

The glove selection is based on available product performance data reviewed by EH&S. Other gloves providing adequate protection are also available.

Please reach out to your [Lab Safety Advisor](#) if assistance is needed selecting other types of glove for the processes and chemicals you work with.

## Minimizing Hand and Hazardous Chemical-Contact Risks in Labs

- Always use techniques that minimize contact and splashing.
- Monitor the condition of your gloves (especially disposable gloves) and change your gloves if they are damaged or contaminated with high contact hazard materials.
- Change disposable gloves often and wash your hands when you remove your gloves.
- Consider double gloving in situations where practical considerations may limit the best glove selection.
- Reusable gloves provide better forearm protection and puncture resistance, and are the most appropriate gloves for very high or high contact hazardous chemical contact protection.
- Reusable gloves are recommended for all work requiring [immersion protection](#).
- Be aware of conditions that may affect your contact hazard's risk and adjust your protection as needed.
  - **Skin health:** Abrasions and open wounds may allow for increased absorption of chemicals.
  - **Chemical temperature:** Heated chemicals may permeate faster.
  - **Solvent transport:** Solvents with low contact hazards may transport higher hazard chemicals (for example, DMSO and chloroform).

EH&S continually updates this guide's chemicals and glove selection. This guide's gloves are available in the VWR Stockrooms on each campus.



## Glove Selection Guide Key

### Hazard Levels

The chemicals listed in the glove selection guide are color coded based on the level of hazard posed by contact with the chemicals.

Hazard Level	Color
Low	Green
Medium	Yellow
High	Orange
Very High	Red

### Glove Protection Levels and Constraints

The glove protection levels based on the type of contact with chemicals, and other constraints such as the tested breakthrough time, are noted for each glove type.

Abbreviation	Protection Level
C	Intermittent contact
I	Immersion
ND	No permeation data available
NR	Not recommended
S	Splash

The breakthrough time in minutes is indicated for S, C, and I levels of protection.



For instance, acetic acid (99%w/w) {anhydrous, glacial} poses a high hazard from any contact and has the following glove protection levels:

- The Ansell Microflex 93-260 glove is S-30, providing 30 minutes of protection for activities that could involve splashing but don't involve intermittent contact with or immersion in that chemical.
- The Showa 8005 glove is ND, showing that no permeation data is available for that chemical.
- The Ansell TouchNTuff 92-600 glove is NR, showing it isn't recommended for use with that chemical.

See [Glove Selection Determination](#) for more details on guide terminology.

## Disposable Gloves

Glove Type	Materials
Ansell Microflex 93-260	Nitrile and neoprene (7.9 mil)
Showa 8005	Nitrile (8 mil)
Ansell TouchNTuff 92-600	Nitrile (4.9-5.5 mil)

## Glove Selection Guide

Chemical <sup>1</sup>	Contact Hazard Ranking	CAS <sup>2</sup>	Ansell Microflex 93-260	Showa 8005	Ansell TouchNTuff 92-600
Acetic acid (99%w/w) {anhydrous, glacial}	High	64-19-7	S-30	ND	NR
Acetone	Low	67-64-1	S-3	S-6	S-0.5

<sup>1</sup> With contact hazard ranking color code.

<sup>2</sup> Chemical Abstracts Service (CAS) registry numbers uniquely identify each chemical (despite nomenclature).



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ENVIRONMENTAL HEALTH & SAFETY

Chemical <sup>1</sup>	Contact Hazard Ranking	CAS <sup>2</sup>	Ansell Microflex 93-260	Showa 8005	Ansell TouchNTuff 92-600
Acetonitrile	Low	75-05-8	S-5	C-15	S-<5
Ammonium hydroxide (28%w/w)	High	1336-21-6	S-51	I-480	S-29
Benzene	Medium	71-43-2	S-5	S-3	ND
Butanol [n-]	Low	71-36-3	I-434	C-24	I-70
Butanol [tert-]	Low	75-65-0	ND	ND	ND
Carbon disulfide	Medium	75-15-0	S-1	ND	S-<5
Carbon tetrachloride	Medium	56-23-5	C-39	C-24	
Chlorobenzene	Low	108-90-7	ND	S-6	ND
Chloroform	Medium	67-66-3	S-2	ND	S-0.3
Cresols	Medium	1319-77-3	ND	ND	ND
Cyclohexane	Low	110-82-7	ND	I-240	I-480
Cyclohexanol	Medium	108-93-0	I-480	I-275	ND
Cyclohexanone	Medium	108-94-1	S-9	ND	S-<5
Decahydronaphthalene {decalin}	High	91-17-8	ND	ND	ND
Dichlorobenzene [o-]	Low	95-50-1	ND	ND	ND
Dichloroethane [1,1-]	Low	75-34-3	ND	ND	ND



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Chemical <sup>1</sup>	Contact Hazard Ranking	CAS <sup>2</sup>	Ansell Microflex 93-260	Showa 8005	Ansell TouchNTuff 92-600
Dichloromethane <sup>3</sup>	Medium	75-09-2	S-1	S-4	S-<5
Diethylamine	High	109-89-7	NR	S-10	NR
Dimethoxyethane [1,2-] {glyme}	Medium	110-71-4	ND	ND	ND
Dimethyl sulfoxide {DMSO}	Low	67-68-5	I-93	I-480	S-5
Dimethylformamide [N,N-] {DMF}	Medium	68-12-2	S-9	ND	S-<5
Dioxane [1,4-]	Medium	123-91-1	ND	C-14	ND
Ethylene glycol monomethyl ether {methyl cellosolve}	Medium	109-86-4	ND	S-9	ND
Ethanol	Low	64-17-5	I-66	I-240	S-8
Ethanol (70%w/w)	Low	64-17-5	ND	ND	C-27
Ethyl acetate	Low	141-78-6	S-5	C-14	S-1

<sup>3</sup> At a minimum, double-glove with nitrile or nitrile and neoprene combination gloves such as Ansell Microflex 93-260 when performing low-risk work with dichloromethane (methylene chloride). Immediately remove the gloves if they become contaminated. For work with larger volumes or where there is a greater splash hazard, use a more resistant glove such as Ansell 2-100 liners under a nitrile or nitrile and neoprene combination glove.



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Chemical <sup>1</sup>	Contact Hazard Ranking	CAS <sup>2</sup>	Ansell Microflex 93-260	Showa 8005	Ansell TouchNTuff 92-600
Ethyl ether	Low	60-29-7	ND	S-3	S-0.4
Ethylene glycol monoethyl ether	Medium	110-80-5	ND	S-9	ND
Formalin (37 % w/w)	High	50-00-0	I-480	I-480	I-480
Formic Acid	High	64-18-6	S-20	ND	ND
Formic Acid (90% w/w)	High	64-18-6	ND	S-30	ND
Hexamethyphosphoramide {HMPA}	Medium	680-31-9	ND	ND	ND
Hexane [n-]	Medium	110-54-3	I-280	I-85	I-480
Hydrobromic Acid (49%w/w)	High	10035-10-6	ND	ND	I-480
Hydrochloric acid (36%w/w)	High	7647-01-0	I-480	I-480	S-51
Hydrofluoric Acid (10% w/w)	High	7664-39-3	ND	ND	S-13
Hydrofluoric acid (48% w/w)	Very High	7664-39-3	ND	S-50	NR
Hydrogen peroxide (30%w/w)	Low	7722-84-1	I-480	I-480	C-41
Isoamyl acetate	Low	123-92-2	ND	S-7	ND



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ENVIRONMENTAL HEALTH & SAFETY

Chemical <sup>1</sup>	Contact Hazard Ranking	CAS <sup>2</sup>	Ansell Microflex 93-260	Showa 8005	Ansell TouchNTuff 92-600
Isobutanol	Low	78-83-1	ND	I-70	ND
Isobutyl acetate	Low	110-19-0	ND	ND	ND
Isopropanol	Low	67-63-0	I-204	I-240	I-117
Methanol	Medium	67-56-1	C-21	C-13	S-1
Methoxymethyl ether [bis(2-)] {diglyme}	Low	111-96-6	ND	ND	ND
Methyl acetate	Low	79-20-9	ND	S-3	ND
Nitric acid (23%w/w)	High	7697-37-2	ND	I-480	ND
Nitric acid (50%w/w)	High	7697-37-2	ND	ND	S-9
Nitric acid (65%w/w)	High	7697-37-2	S-30	ND	ND
Nitric acid (70%w/w)	High	7697-37-2	ND	ND	NR
Nitrobenzene	Medium	98-95-3	ND	S-9	ND
Nitromethane	Low	75-52-5	ND	S-5	ND
Pentane [n-]	Low	109-66-0	ND	C-59	ND
Perchloric acid (70%w/w)	High	7601-90-3	ND	ND	ND
Petroleum ether	Low	8032-32-4	ND	I-240	ND
Phenol	High	108-95-2	ND	S-10	ND





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Chemical <sup>1</sup>	Contact Hazard Ranking	CAS <sup>2</sup>	Ansell Microflex 93-260	Showa 8005	Ansell TouchNTuff 92-600
Phenol/chloroform/iso amyl alcohol (25:24:1)	High	NA	ND	ND	ND
Phosphoric acid (85% w/w)	High	7664-38-2	I-480	I-480	ND
Potassium hydroxide (45% w/w)	High	1310-58-3	ND	I-480	ND
Pyridine	Low	110-86-1	ND	ND	ND
Sodium hydroxide (40-50%w/w)	High	1310-73-2	I-480	I-480	I-480
Styrene	Low	100-42-5	ND	S-6	ND
Sulfuric acid (96%w/w)	High	7664-93-6	S-49	ND	NR
Tetrahydrofuran	Medium	109-99-9	S-2	ND	S- <5
Thionyl chloride	High	7719-07-9	ND	ND	ND
Toluene	Low	108-88-3	S-6	ND	S-1
Triethylamine	High	121-44-8	I-342	ND	C-155
Trimethylbenzene [1,3,5-] {mesitylene}	Low	108-67-8	ND	ND	ND
Trimethylpentane [2,2,4-] {isooctane}	Low	540-84-1	ND	ND	ND
Xylene mixture	Low	1330-20-7	C-11	C-11	S-<5



## Glove Selection Determination

### Chemical Contact Hazard Rankings

Acute toxicity, direct skin affects, and systemic effects from skin absorption are considered when assigning chemical contact hazard levels.

Chemicals may have other health or physical hazards that must be controlled by other methods, but it's only necessary to consider contact hazards when selecting gloves for chemical protection.

Safety Data Sheets (SDS)<sup>4</sup> help determine acute toxicity and direct skin effects, but other sources may be required to evaluate the significance of systemic effects and absorption.

### Chemical Contact Hazard Determination Process Summary

Contact Hazard Ranking	Hazard Properties	GHS Hazard Statement Examples
Low	No skin hazards. Skin irritation. Can't move through the skin.	Causes skin irritation.
Medium	Moderate acute toxicity or serious chronic effects. Can move through the skin.	Toxic in contact with the skin. May cause cancer.
High	Cause immediate damage to skin.	Causes severe skin burns.

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<sup>4</sup> In the current globally harmonized system (GHS) format.



Contact Hazard Ranking	Hazard Properties	GHS Hazard Statement Examples
Very High	High acute toxicity. Can move through the skin.	Fatal if in contact with the skin.

## Glove Performance Ratings

Glove performance rating is based primarily on the glove material’s breakthrough time.

Breakthrough time indicates the amount of time it takes for a chemical to migrate from glove outside surfaces to inside surfaces (thereby contacting the skin). Breakthrough times are usually determined under conditions of constant contact under pressure and may underestimate performance in labs. Manufacturer-provided breakthrough times based on intermittent contact testing are used when available.

EH&S reviews the readily available permeation data for all [Glove Selection Guide gloves](#).

Glove Performance Rating	Breakthrough Time
Excellent	Greater than 240 minutes.
Good	Between 60 and 240 minutes.
Fair	Between 10 and 60 minutes.
Poor	Less than 10 minutes.

## Glove Protection Levels

Glove protection levels consider the likelihood and estimated amount of chemical contact on gloves. The chemical amounts you use and how you manipulate them define the glove protection level.



Protection Level	Description
Splash	Procedures that only require contact with containers and not their contents, but risk small-scale contamination due to splashing. The splash risk increases when using and decanting larger amounts and containers.
Intermittent contact	Procedures where occasional short-term contact (one minute to five minutes) of gloves with chemicals or wetted parts may occur, such as during acid etching or cleaning procedures. Intermittent contact also applies to situations where splashing is more likely, such as spraying or working with boiling solvents.
Full immersion	Procedures that require either periods of extended glove immersion or frequent intermittent contact over an extended period. Full immersion protection is more commonly associated with industrial settings than lab settings.

## Chemical Contact Hazard Matrix

Use this matrix to determine glove protection levels. Determine the maximum protection level using the appropriate glove performance rating and chemical contact hazard.

Glove Performance Rating	Low	Medium	High	Very High
Poor	Splash	Splash	N/A	N/A
Fair	Splash/contact	Splash/contact	Splash	N/A
Good	Splash/contact/ immersion	Splash/contact/ immersion	Splash/contact	Splash/contact
Excellent	Splash/contact/ immersion	Splash/contact/ immersion	Splash/contact/ immersion	Splash/contact/ immersion