

Glove	VITON® (North, 10 mil)			VITON® (Best, 30 mil)			SILVERSHIELD®/4H (North, 2.7 mil)			PVA® (Ansell Edmont)		
	D	BT	PR	D	BT	PR	D	BT	PR	D	BT	PR
Acetaldehyde	P	NR	281.9	P	NR	NR	NT	>240 min.	ND	NR	NT	NT
Acetic Acid (Glacial)	NT	NT	NT	NT	NT	NT	NT	>480 min.	ND	NR	NT	NT
Acetic Acid (50%)	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Acetone	P	NR	ID	NR	NR	NR	NT	>1440 min.	ND	P	NT	NT
Acetonitrile	NT	NT	NT	G	NR	NR	NT	>1440 min.	ND	NT	150 min.	G
Ammonium Hydroxide (29%)	NT	NT	NT	E	ND	ND	NT	>240 min.	ND	NR	NT	NT
Aniline	G	10 min.	18.7	E	ND	ND	NT	>1440 min.	ND	F	ND	E
Benzene	G	6 hr.	0.012	E	ND	ND	NT	>1440 min.	ND	E	ND	E
Butyl Acetate	P	NR	NT	P	NR	NR	NT	>480 min.	ND	G	ND	E
p-tert-Butyltoluene	E	>8 hr.	ND	E	ND	ND	NT	NT	NT	NT	NT	NT
Carbon Disulfide	E	>8 hr.	ND	E	ND	ND	NT	>1440 min.	ND	E	ND	E
Carbon Tetrachloride	E	>13 hr.	ND	E	ND	ND	NT	>480 min.	ND	E	ND	E
Chloroform	E	9.5 hr.	0.46	E	ND	ND	NT	>1440 min.	ND	E	ND	E
Chloronaphthalene	E	>16 hr.	ND	NT	NT	NT	NT	NT	NT	G	ND	E
Cyclohexane	E	>7 hr.	ND	E	ND	ND	NT	>480 min.	ND	NT	NT	NT
Cyclohexanol	E	>8 hr.	ND	E	ND	ND	NT	>480 min.	ND	G	ND	E
Cyclohexanone	P	29 min.	86.3	G	NR	NR	NT	>480 min.	ND	NT	NT	NT
Dibutyl Phthalate	E	>8 hr.	ND	E	ND	ND	NT	>240 min.	ND	E	ND	E
1,2 Dichloroethane	E	6.9 hr.	0.81	E	ND	ND	NT	>240 min.	ND	NT	NT	NT
Diisobutyl Ketone (80%)	F	1.2 hr.	90.6	E	ND	ND	NT	>240 min.	ND	G	ND	E
Dimethyl Formamide	P	8 min.	6.5	P	NR	NR	NT	>1440 min.	ND	NR	NT	NT
Dioxane	F	23 min.	26.8	E	12 min.	604	NT	>480 min.	ND	P	NT	NT
Divinyl Benzene	E	>17 hr.	ND	G	ND	ND	NT	NT	NT	NT	NT	NT
Ethyl Acetate	P	NT	NT	NR	NR	NR	NT	>1440 min.	ND	F	ND	E
Ethylamine (70% in water)	P	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Alcohol	NT	NT	NT	E	ND	ND	NT	>480 min.	ND	NR	NT	NT
Ethyl Ether	P	12 min.	21.5	G	29 min.	210	NT	NT	NT	G	ND	E
Formaldehyde (37% in water)	E	>16 hr.	ND	E	ND	ND	NT	>240 min.	ND	P	NT	NT
n-hexane	NT	>11 hr.	ND	E	ND	ND	NT	>1440 min.	ND	G	ND	E
Hydrazine (70% in water)	P	NR	NT	E	ND	ND	NT	>240 min.	ND	NR	NT	NT
Hydrochloric Acid (37%)	E	NT	NT	E	ND	ND	NT	>240 min.	ND	NR	NT	NT
Hydrofluoric Acid	G	NT	NT	E	185 min.	0.20	NT	>240 min.	ND	NR	NT	NT
Methylamine (40% in water)	E	>16 hr.	ND	E	ND	ND	NT	>240 min.	ND	NR	NT	NT
Methylene Chloride	F	1 hr.	7.32	E	113	48	NT	>1440 min.	ND	G	ND	E
MEK	P	NT	NT	NR	NR	NR	NT	>1440 min.	ND	F	90 min.	VG
Morpholine	G	1.9 hr.	97	E	234 min.	63	NT	>480 min.	ND	G	90 min.	G
Nitrobenzene	E	>8 hr.	ND	E	ND	ND	NT	>1440 min.	ND	G	ND	E
Nitropropane	P	21 min.	26.1	F	NR	NR	NT	>240 min.	ND	E	>6 hr.	E
Pentachlorophenol (1% in Kerosene)	ID	>13 hr.	ND	E	ND	ND	NT	NT	NT	E	5 min.	F
n-Pentane	E	>8 hr.	ND	E	ND	ND	NT	>480 min.	ND	G	ND	E
Phenol (85% in water)	E	>15 hr.	ND	E	ND	ND	NT	NT	NT	F	ND	E
Propyl Acetate	P	NT	NT	P	NR	NR	NT	>480 min.	ND	G	2 hr.	VG
Sodium Hydroxide (50%)	G	NT	NT	E	ND	ND	NT	>480 min.	ND	NR	NT	NT
Sulfuric Acid (25%)	NT	NT	NT	NT	NT	NT	NT	>240 min.	ND	NR	NT	NT
Tetrachloroethylene	E	>17 hr.	ND	E	ND	ND	NT	>1440 min.	ND	NR	NT	NT
Toluene	E	>16 hr.	ND	E	ND	ND	NT	>1440 min.	ND	G	ND	E
Toluene Diisocyanate	E	>16 hr.	ND	E	ND	ND	NT	NT	NT	G	ND	E
1,1,1-Trichloroethane	E	>15 hr.	ND	E	ND	ND	NT	>480 min.	ND	G	ND	E
Trichloroethylene	G	7.4 hr.	0.24	E	ND	ND	NT	>240 min.	ND	E	ND	E
Vinyl Chloride	G	4.4 hr.	0.098	E	ND	ND	NT	>480 min.	ND	NT	NT	NT
Xylene	E	>8 hr.	ND	E	ND	ND	NT	>1440 min.	ND	E	ND	E

D=Degradation

BT=Breakthrough Time

PR=Permeation Rate

E=Excellent F=Fair G=Good ID=Insufficient Data ND=None Detected
NT=Not Tested NR=Not Recommended P=Poor VG=Very Good >Greater Than <Less Than

Glove	Chemical Degradation, breakthrough time and permeation rate for various chemicals and specific glove materials.														
	BUTYL (Lab Safety Supply, 25 mil)			BUTYL (North, 17 mil)			NEOPRENE (Ansell Edmont)(15 mil, unsupported)			NEOPRENE (Best Ultraflex)			NEOPRENE (Best Neoprene)		
Chemical	D	BT	PR	D	BT	PR	D	BT	PR	D	BT	PR	D	BT	PR
Acetaldehyde	NT	4 min.	2.1	E	9.6 hr.	0.066	E	10 min.	P	E	0	17	E	21 min.	42
Acetic Acid (Glacial)	NT	ND	NT	NT	NT	NT	E	7 hr.	NT	NT	NT	NT	NT	NT	NT
Acetic Acid (50%)	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Acetone	NT	ND	NT	E	>17 hr.	ND	G	5 min.	F	E	5 min.	102	E	35 min.	52
Acetonitrile	NT	ND	NT	E	>8 hr.	ND	E	30 min.	VG	E	27 min.	16	E	65 min.	1
Ammonium Hydroxide (29%)	NT	ND	NT	NT	NT	NT	E	>6 hr.	NT	E	180 min.	27	E	ND	ND
Aniline	NT	ND	NT	F	>8 hr.	ND	G	35 min.	VG	G	49 min.	19	E	32 min.	8
Benzene	NT	NT	NT	P	31 min.	32.3	NR	NT	NT	P	9 min.	264	P	15 min.	285
Butyl Acetate	NT	94 min.	10	G	1.9 hr.	7.61	NR	NT	NT	P	NR	NR	G	46 min.	70
p-tert-Butyltoluene	NT	91 min.	>32	G	1.7 hr.	8.0	NT	NT	NT	E	219 min.	38	E	158 min.	18
Carbon Disulfide	NT	<4 min.	>500	P	7 min.	98.0	NR	NT	NT	F	NR	NR	NR	NR	NR
Carbon Tetrachloride	NT	NT	NT	P	NR	ID	NR	NT	NT	NR	28 min.	292	F	73 min.	7
Chloroform	NT	NT	NT	P	NR	ID	NR	NT	NT	NR	4 min.	393	P	23 min.	298
Chloronaphthalene	NT	NT	NT	P	NR	ID	NR	NT	NT	NT	NT	NT	NT	NT	NT
Cyclohexane	NT	4 min.	>23	P	1.1 hr.	20.3	NT	NT	NT	E	36 min.	64	E	228 min.	8
Cyclohexanol	NT	ND	NT	E	>11 hr.	ND	E	2.5 hr.	VG	E	ND	ND	E	ND	ND
Cyclohexanone	NT	ND	NT	E	>16 hr.	ND	NT	NT	NT	G	61 min.	76	G	108 min.	53
Dibutyl Phthalate	NT	ND	NT	E	>16 hr.	ND	F	2 hr.	E	E	ND	ND	E	ND	ND
1,2 Dichloroethane	NT	NT	NT	P	2 hr.	53	NT	NT	NT	F	10 min.	440	F	16 min.	136
Diisobutyl Ketone (80%)	NT	NT	NT	G	3.3 hr.	41.2	P	NT	NT	E	ND	ND	E	ND	ND
Dimethyl Formamide	NT	ND	NT	E	>8 hr.	ND	G	10 min.	G	E	97 min.	22	E	100 min.	57
Dioxane	NT	ND	NT	E	>20 hr.	ND	NR	NT	NT	G	62 min.	112	G	73 min.	35
Divinyl Benzene	NT	54 min.	>64	F	2.2 hr.	238	NT	NT	NT	P	NR	NR	F	NR	NR
Ethyl Acetate	NT	253 min.	>500	G	7.6 hr.	3.4	F	15 min.	G	G	6 min.	156	G	24 min.	195
Ethylamine (70% in water)	NT	ND	NT	E	>12 hr.	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Alcohol	NT	ND	NT	NT	NT	NT	E	90 min.	VG	E	71 min.	23	E	ND	ND
Ethyl Ether	NT	NT	NT	P	8 min.	92.2	E	10 min.	G	G	9 min.	218	G	12 min.	112
Formaldehyde (37% in water)	NT	NT	NT	E	16 hr.	ND	E	2 hr.	E	E	ND	ND	E	ND	ND
n-hexane	NT	4 min.	NT	P	NR	NT	E	45 min.	F	E	31 min.	24	E	173 min.	8
Hydrazine (70% in water)	NT	NT	NT	E	>8 hr.	ND	E	ND	NT	E	ND	ND	E	ND	ND
Hydrochloric Acid (37%)	NT	ND	NT	E	NT	NT	E	ND	NT	E	ND	ND	E	ND	ND
Hydrofluoric Acid	NT	ND	NT	F	NT	NT	E	1 hr.	E	E	ND	ND	E	ND	ND
Methylamine (40% in water)	NT	NT	NT	E	>15 hr.	ND	G	270 min.	G	E	26 min.	4	E	ND	ND
Methylene Chloride	NT	20 min.	>500	P	24 min.	133	NR	NT	NT	P	3 min.	162	NR	7 min.	372
MEK	NT	385 min.	1.3	E	>8 hr.	ND	P	NT	NT	E	9 min.	135	G	30 min.	88
Morpholine	NT	NT	NT	E	>16 hr.	ND	P	NT	NT	E	139 min.	108	E	91 min.	48
Nitrobenzene	NT	ND	NT	E	>23 hr.	ND	NR	NT	NT	F	321 min.	7	F	100 min.	16
Nitropropane	NT	ND	NT	E	>8 hr.	ND	G	5 min.	F	E	175 min.	45	E	98 min.	45
Pentachlorophenol (1% in Kerosene)	NT	NT	NT	P	NT	NT	E	6 min.	E	E	ND	ND	E	ND	ND
n-Pentane	NT	NT	NT	P	NT	NT	E	30 min.	F	E	27 min.	10	E	84 min.	32
Phenol (85% in water)	NT	NT	NT	E	>20 hr.	ND	E	3 hr.	G	G	147 min.	15	E	72 min.	12
Propyl Acetate	NT	109 min.	19	G	2.7 hr.	2.86	P	NT	NT	F	43 min.	89	G	39 min.	111
Sodium Hydroxide (50%)	NT	ND	NT	E	NT	NT	E	ND	NT	E	ND	ND	E	ND	ND
Sulfuric Acid (25%)	NT	ND	NT	NT	NT	NT	E	ND	NT	E	ND	ND	NT	NT	NT
Tetrachloroethylene	NT	<4 min.	>500	P	NT	NT	NR	NT	NT	P	14 min.	857	P	40 min.	299
Toluene	NT	28 min.	>500	F	21 min.	22.1	NR	NT	NT	NR	6 min.	313	F	25 min.	349
Toluene Diisocyanate	NT	NT	NT	E	>8 hr.	ND	NR	NT	NT	E	177 min.	4	E	201 min.	3.3
1,1,1-Trichloroethane	NT	NT	NT	P	NT	NT	NR	NT	NT	P	19 min.	332	F	51 min.	146
Trichloroethylene	NT	NT	NT	P	18 min.	550	NR	NT	NT	NR	5 min.	407	P	12 min.	376
Vinyl Chloride	NT	NT	NT	P	NT	NT	NT	NT	NT	E	17 min.	13	E	7 min.	19
Xylene	NT	NT	NT	P	NT	NT	NR	NT	NT	NR	NR	NR	P	37 min.	225

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Glove	PVC (Best Hustler)			NITRILE (Lab Safety Supply, 22 mil)			NITRILE (Ansell Edmont Sol.Vex, 22 mil)			BARRIER™ (Ansell Edmont, 2.5 mil)		
	D	NR	PR	D	BT	PR	D	BT	PR	D	BT	PR
Acetaldehyde	E	13 min.	212	NT	NT	NT	P	NT	NT	NT	308 min.	E
Acetic Acid (Glacial)	NT	NT	NT	NT	118 min.	1326	G	270 min.	NT	NT	150 min.	NT
Acetic Acid (50%)	NT	NT	NT	E	>480 min.	ND	NT	NT	NT	NT	NT	E
Acetone	G	7 min.	448	P	NT	NT	NR	NT	NT	NT	>480 min.	E
Acetonitrile	E	24 min.	189	NT	NT	NT	F	30 min.	F	NT	>480 min.	E
Ammonium Hydroxide (29%)	E	60 min.	536	E	>480 min.	ND	E	ND	NT	E	30 min.	NT
Aniline	E	71 min.	17	G	72 min.	18	NR	NT	NT	NT	>480 min.	E
Benzene	G	13 min.	247	F	27 min.	582	P	NT	NT	NT	>480 min.	E
Butyl Acetate	G	33 min.	184	G	101 min.	144	F	75 min.	F	NT	>480 min.	E
p-tert-Butyltoluene	E	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT
Carbon Disulfide	P	NR	NR	G	20 min.	516	G	30 min.	F	NT	>480 min.	E
Carbon Tetrachloride	G	46 min.	213	E	341 min.	48	G	150 min.	G	NT	NT	NT
Chloroform	P	10 min.	854	NT	NT	NT	NR	NT	NT	E	20 min.	G
Chloronaphthalene	NT	NT	NT	NT	NT	NT	P	NT	NT	NT	>480 min.	E
Cyclohexane	E	88 min.	21	E	>480 min.	ND	NT	NT	NT	NT	>480 min.	NT
Cyclohexanol	E	NR	ND	NT	NT	NT	E	ND	E	NT	>480 min.	E
Cyclohexanone	G	NR	NR	NT	NT	NT	NT	NT	NT	NT	>480 min.	E
Dibutyl Phthalate	E	ND	ND	NT	NT	NT	G	ND	E	NT	NT	NT
1,2 Dichloroethane	P	NR	NR	P	16 min.	1752	NT	NT	NT	NT	>480 min.	E
Diisobutyl Ketone (80%)	E	ND	ND	NT	NT	NT	E	2 hr.	F	NT	NT	E
Dimethyl Formamide	F	NR	NR	NT	35 min.	246	NR	NT	NT	NT	>480 min.	E
Dioxane	G	41 min.	229	NT	NT	NT	NR	NT	NT	NT	>480 min.	E
Divinyl Benzene	G	37 min.	56	NT	NT	NT	NT	NT	NT	NT	>480 min.	NT
Ethyl Acetate	G	5 min.	129	NT	NT	NT	NR	NT	NT	NT	>480 min.	E
Ethylamine (70% in water)	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	>480 min.	NT
Ethyl Alcohol	E	66 min.	4	E	>480 min.	ND	E	4 hr.	VG	NT	>480 min.	E
Ethyl Ether	E	14 min.	805	E	64 min.	78	E	2 hr.	G	NT	>480 min.	E
Formaldehyde (37% in water)	E	ND	ND	E	>480 min.	ND	E	ND	E	NT	>480 min.	NT
n-hexane	E	29 min.	39	E	>480 min.	ND	E	ND	E	NT	>480 min.	NT
Hydrazine (70% in water)	E	ND	ND	E	>480 min.	ND	E	ND	NT	NT	NT	NT
Hydrochloric Acid (37%)	E	ND	ND	E	>480 min.	ND	E	ND	NT	NT	>480 min.	NT
Hydrofluoric Acid	E	110 min.	8	E	134 min.	30	E	2 hr.	NT	NT	>480 min.	E
Methylamine (40% in water)	E	119 min.	3	NT	NT	NT	E	ND	E	E	>480 min.	E
Methylene Chloride	P	NR	NR	NT	NT	NT	NR	NT	NT	E	20 min.	VG
MEK	F	NR	NR	NT	6 min.	522	NR	NT	NT	E	>480 min.	E
Morpholine	E	83 min.	137	NT	NT	NT	NR	NT	NT	NT	>480 min.	E
Nitrobenzene	P	NR	NR	P	60 min.	90	NR	NT	NT	NT	>480 min.	E
Nitropropane	G	NR	NR	NT	NT	NT	NR	NT	NT	NT	>480 min.	E
Pentachlorophenol (1% in Kerosene)	E	ND	ND	NT	NT	NT	E	ND	E	NT	>480 min.	NT
n-Pentane	E	28 min.	18	NT	NT	NT	E	ND	E	E	>480 min.	E
Phenol (85% in water)	E	164 min.	18	NT	>480 min.	ND	NR	NT	NT	NT	>480 min.	E
Propyl Acetate	F	NR	NR	NT	NT	NT	F	20 min.	G	NT	NT	NT
Sodium Hydroxide (50%)	E	ND	ND	E	>480 min.	ND	E	ND	NT	E	>480 min.	NT
Sulfuric Acid (25%)	NT	NT	NT	E	>480 min.	ND	E	ND	NT	E	>480 min.	NT
Tetrachloroethylene	G	NR	NR	G	373 min.	27	G	>5 hr.	VG	NT	>480 min.	E
Toluene	G	19 min	263	P	28 min.	150	F	10 min.	F	NT	>480 min.	E
Toluene Diisocyanate	G	97 min..	5.4	F	>480 min.	ND	NR	NT	NT	NT	>480 min.	E
1,1,1-Trichloroethane	G	52 min.	92	P	131 min.	264	F	90 min.	P	NT	>480 min.	E
Trichloroethylene	P	NR	NR	P	9 min.	372	NR	NT	NT	NT	>480 min.	E
Vinyl Chloride	E	19 min.	20	NT	NT	NT	NT	NT	NT	NT	>480 min.	E
Xylene	G	23 min.	28	G	92 min.	24	G	75 min.	F	NT	>480 min.	E

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F=Fair

G=Good

ID=Insufficient Data

ND=None Detected

NT=Not Tested

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P=Poor

VG=Very Good

>Greater Than <Less Than

The chart on pages 1–3 will help you select the proper glove for handling the hazardous chemicals listed. Choose the most appropriate glove by comparing the degradation, breakthrough time and permeation rate. This chart is a collection of data provided to us by the individual glove manufacturers. Remember that these tests were conducted on specific gloves under laboratory conditions. We recommend that you conduct your own tests to determine the appropriate glove for your application.

Degradation (D) is a reduction in physical properties of the glove material. Common effects include swelling, wrinkling, stiffness, change in color or other deterioration. The degradation ratings indicate how well a glove will hold up when working with a specific chemical. Degradation tests vary by manufacturer—there’s no standardized test that’s used by everyone in the industry. However, the glove material is usually exposed to the test chemical and the percent weight change is then determined at four time intervals: 5, 30, 60 and 240 min. In our chart, we report results for the 30 min. test.

DEGRADATION KEY

RATING	% WEIGHT CHANGE
E=Excellent	0–10%
G=Good	11–20%
F=Fair	21–30%
P=Poor	over 30%
NR=Not Recommended	
NT=Not Tested	

Degradation resistance is essential to worker safety but should not be the sole determining factor. The chemical’s breakthrough time and permeation rate are the two other important factors that must be considered.

Breakthrough Time (BT) is the elapsed time between initial contact of the chemical on the glove material and the analytical detection if the chemical passes through the glove material. This test is conducted per ASTM F739 standard test method for Resistance of Protective Clothing Materials to Permeation by Hazardous Liquid Chemicals. The higher the result, the longer it takes for the chemical to pass through the glove material. The actual time is reported on the chemical compatibility chart. If breakthrough did not occur, the data reported is ND (none detected) or > (greater than) the indicated test period.

BREAKTHROUGH TIME KEY

- ND=None Detected
- >=Greater Than
- NR=Not Recommended
- <=Less Than
- NT=Not Tested

Permeation Rate (PR) is a measurement which describes the rate of chemical passing through the glove material

after chemical breakthrough has occurred. Manufacturers report permeation rate in different ways. Some report in micrograms of chemical per square centimeter of glove material per minute. The higher the result, the more chemical passing through the glove material. Other manufacturers rate the permeation similar to that done for degradation—Excellent (E), Good (G), Fair (F), Poor (P) and Not Recommended (NR). If chemical breakthrough does not occur, then permeation is not measured. This is reported as ND (none detected) or NT (not tested), depending upon the manufacturer. This test is also conducted per ASTM F739.

PERMEATION RATE KEY

- E=Excellent
- VG=Very Good
- G=Good
- F=Fair
- P=Poor
- NR=Not Recommended
- ND=None Detected
- NT=Not Tested
- ID=Insufficient Data

NOTE: This chemical compatibility information shows how each specific glove material performed in degradation, breakthrough and permeation tests against 51 common chemicals. These tests were performed under laboratory test conditions which can vary from their end use. Therefore, this information must be used only as a guide. The suppliers of this chemical data (North, Best, Safety 4, Mapa Professional and Ansell Edmont) encourage all users to conduct their own backup tests to determine the suitability of a glove for a specific application.

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