

NORTH

***Chemical
Resistance
Guide***

CHEMICAL RESISTANCE GUIDE

This Chemical Resistance Guide incorporates three types of information:

- **Degradation (D)** is a deleterious change in one or more of the glove's physical properties. The most obvious forms of degradation are the loss of the glove's strength and excessive swelling. Several published degradation lists (primarily "The General Chemical Resistance of Various Elastomers" by the Los Angeles Rubber Group, Inc.) were used to determine degradation.
- **Breakthrough time (BT)** is defined as the elapsed time between initial contact of the liquid chemical with the outside surface of the glove and the time at which the permeation rate reaches 0.1 mg/m²/sec. WHEN BREAKTHROUGH OCCURS, THE GLOVE IS NO LONGER PROVIDING ADEQUATE PROTECTION.
- **Permeation rate (PR)**, measured in milligrams per square meter per second (mg/m²/sec) is the measured steady state flow of the permeating chemical through the glove elastomer. Glove thickness plays an important role in resistance to permeation.

The glove styles tested for permeation were the SSG, F101, B174, CS113B, LA102G and PNLB1815. The permeation data in this guide are based on permeation tests performed in accordance with ASTM Standard F 739 under laboratory conditions by North Safety Products or independent AIHA accredited laboratories. Neither North Safety Products nor the independent laboratory assumes any responsibility for the suitability of an end user's selection of gloves based on this guide.

General Recommendation:

The Guide also provides a color-coded general recommendation on which gloves should be evaluated and tested first, based on data from multiple sources. (See general recommendation color key).

Technical Assistance:

Data on chemicals not listed here can be obtained by calling the North Technical Service Department at

(800) 430-4110. North also offers **ezGuide™**, an interactive software program which is designed to electronically help you select the proper glove for use against specific chemicals. This "user friendly" guide walks you step-by-step through the process to determine what type of glove to wear and its permeation resistance to the selected contaminant. Product features, benefits and ordering information of the suggested products also are included in the program. **ezGuide** can be accessed from the North web site, www.northsafety.com or ordered by e-mailing us at marketing@northsafety.com.

The finest chemical handling gloves deserve to be used with the finest respiratory products. Please consult the current North Safety Products Respiratory Protection Catalog and **ezGuide™** for proper respiratory selection.

Warning:

Protective gloves and other protective apparel selection must be based on the user's assessment of the workplace hazards. Glove and Apparel materials do not provide unlimited protection against all chemicals. It is the users responsibility to determine before use that the Glove and Apparel will resist permeation and degradation by the chemicals (including chemical mixtures) in the environment of intended use.

Failure by the user to select the correct protective gloves can result in injury, sickness or death




To obtain maximum life, protective gloves and other protective apparel should have chemicals removed from the surface by washing or other appropriate methods after each use. Protective apparel should be stored away from the contaminating atmosphere.

Punctured, torn or otherwise ruptured apparel must be removed from service; unservicable apparel may be disposed of only in accordance with applicable waste disposal regulations.

Key to Degradation and Permeation Ratings

- E - Excellent Exposure has little or no effect. The glove retains its properties after extended exposure
- G - Good Exposure has minor effect with long term exposure. Short term exposure has little or no effect
- F - Fair Exposure causes moderate degradation of the glove. Glove is still useful after short term exposure but caution should be exercised with extended exposure
- P - Poor Short term exposure will result in moderate degradation to complete destruction
- N/D Permeation was not detected during the test
- I/D Insufficient data to make a recommendation

General Recommendation Color Key

-  Good for total immersion
-  Good for accidental splash protection and intermittent contact
-  Only use with extreme caution. Glove will fail with only short exposure

Physical Performance Chart

| Physical Characteristics | Silver Shield® | Viton† | Butyl | Chemsoft® | Nitrile | Natural Rubber |
|----------------------------|----------------|--------|-------|-----------|---------|----------------|
| Abrasion Resistance | F | G | G | E | E | E |
| Cut Resistance | P | G | G | E | E | E |
| Puncture (Snag) Resistance | P | G | G | E | E | E |
| Flexibility | E | G | G | E | E | E |
| Heat Resistance | F | G | G | G | G | G |
| Ozone Resistance | E | E | E | G | G | P |
| Tensile Strength | E | G | G | E | E | E |
| Low Gas Permeability | E | E | E | F | F | P |

Note: Products in these categories vary in capabilities. Laboratory tests are necessary for specific recommendations.

† Viton is a Registered Trademark of DuPont Company.

| | | Silver Shield | | | Viton | | | Butyl | | | Chemsoft | | | Nitrile | | | Natural Rubber | | |
|------------------------------|-----------|---------------|--------|-----|-------|---------|-------|-------|---------|-------|----------|---------|-------|---------|---------|------|----------------|---------|------|
| Chemical Name | CAS No. | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR |
| Acetaldehyde | 75-07-0 | E | >8 hrs | N/D | P | 0 min | 281.9 | E | >8 hrs | 0.066 | I/D | I/D | I/D | P | 0 min | 161 | I/D | I/D | I/D |
| Acetic Acid (100%) (Glacial) | 64-19-7 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | F | 37 min | 13.3 | F | 38 min | 1.9 | F | 1.3 hrs | 0.39 |
| Acetic Aldehyde | 75-07-0 | E | >8 hrs | N/D | P | 0 min | 281.9 | E | >8 hrs | 0.066 | I/D | I/D | I/D | P | 0 min | 161 | I/D | I/D | I/D |
| Acetic Ester | 141-78-6 | E | >8 hrs | N/D | I/D | I/D | I/D | E | 7.6 hrs | 3.4 | I/D | I/D | I/D | P | 8 min | 145 | I/D | I/D | I/D |
| Acetone | 67-64-1 | E | >8 hrs | N/D | P | 2 min | 383 | E | >8 hrs | N/D | P | 1 min | 42.3 | P | 3 min | 291 | P | 8 min | 93.2 |
| Acrylic Acid | 79-10-7 | E | >8 hrs | N/D | G | 5.9 hrs | 0.23 | E | >8 hrs | N/D | I/D | I/D | I/D | F | I/D | I/D | G | 54 min | 1.6 |
| Acrylonitrile | 107-13-1 | E | >8 hrs | N/D | F | 14 min | 28 | E | >8 hrs | N/D | P | 4 min | 42 | P | 6 min | 29.8 | P | 16 min | 0.11 |
| Ammonia (99%) | 7664-41-7 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Ammonium Hydroxide (29%) | 1336-21-6 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | F | 2 hrs | 0.115 | F | 2.2 hrs | 0.05 | G | 60 min | 28.7 |
| Aniline | 62-53-3 | E | >8 hrs | N/D | P | 6 min | 18.7 | E | >8 hrs | N/D | I/D | I/D | I/D | F | 1.1 hrs | 45 | I/D | I/D | I/D |
| Aniline Oil | 62-53-3 | E | >8 hrs | N/D | P | 6 min | 18.7 | E | >8 hrs | N/D | I/D | I/D | I/D | F | 1.1 hrs | 45 | I/D | I/D | I/D |
| Benzaldehyde | 100-52-7 | I/D | I/D | I/D | E | >8 hrs | 4 | E | >8 hrs | N/D | I/D | I/D | I/D | P | I/D | I/D | I/D | I/D | I/D |
| Benzene | 71-43-2 | E | >8 hrs | N/D | E | 5.9 hrs | 0.012 | P | 31 min | 32.3 | P | I/D | I/D | P | <6 min | >29 | I/D | I/D | I/D |
| Bromoacetonitrile | 590-17-0 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Bromobenzene | 108-86-1 | E | I/D | I/D | E | >8 hrs | N/D | P | 32 min | 39.8 | I/D | I/D | I/D | P | 13 min | 9.1 | I/D | I/D | I/D |
| 1,3-Butadiene | 106-99-0 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Butyl Acetate | 123-86-4 | E | >8 hrs | N/D | P | I/D | I/D | G | 1.8 hrs | 7.61 | I/D | I/D | I/D | P | 29 min | 54.4 | F | 18 min | 47 |
| Butyraldehyde | 123-72-8 | I/D | I/D | I/D | P | 54 min | 9 | E | >8 hrs | N/D | I/D | I/D | I/D | P | I/D | I/D | I/D | I/D | I/D |
| Carbon Bisulfide | 75-15-0 | E | >8 hrs | N/D | E | >8 hrs | N/D | P | 3 min | 98.4 | I/D | I/D | I/D | P | 9 min | 51 | I/D | I/D | I/D |
| Carbon Disulfide | 75-15-0 | E | >8 hrs | N/D | E | >8 hrs | N/D | P | 3 min | 98.4 | I/D | I/D | I/D | P | 9 min | 51 | I/D | I/D | I/D |
| Carbon Tetrachloride | 56-23-5 | E | >8 hrs | N/D | E | >13 hrs | N/D | P | I/D | I/D | F | 1.3 hrs | 3.45 | G | 3.4 hrs | 5 | I/D | I/D | I/D |
| Caustic Soda (50%) | 1310-73-2 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D |
| Chlorine | 7782-50-5 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| 2-Chloroethanol | 107-07-3 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Chloroform | 67-66-3 | E | >8 hrs | N/D | E | 9.5 hrs | 0.46 | P | I/D | I/D | I/D | I/D | I/D | P | 4 min | 352 | I/D | I/D | I/D |
| 3-Chloroprene | 107-05-1 | E | >4 hrs | N/D | F | 31 min | 16 | P | 50 min | 281 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Curing Agent Z | N/A | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Cyclohexane | 110-82-7 | E | >4hrs | N/D | E | >7 hrs | N/D | P | 50 min | 103.8 | E | >8 hrs | N/D | G | I/D | I/D | I/D | I/D | I/D |
| Cyclohexanol | 108-93-0 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >11 hrs | N/D | E | >6 hrs | N/D | E | >16 hrs | N/D | I/D | I/D | I/D |
| Cyclohexanone | 108-94-1 | E | >8 hrs | N/D | P | 29 min | 86.3 | E | >16 hrs | N/D | I/D | I/D | I/D | P | I/D | I/D | F | 15 min | 46.9 |
| Di (2-ethylhexyl) phthalate | 117-81-7 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D |
| Dibutylphthalate | 84-74-2 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >16 hrs | N/D | E | >8 hrs | N/D | E | >16 hrs | N/D | I/D | I/D | I/D |
| 1,2-Dichloroethane | 107-06-2 | E | >8 hrs | N/D | E | >8 hrs | N/D | P | 2.9 hrs | 53 | I/D | I/D | I/D | P | 8 min | 82.7 | I/D | I/D | I/D |
| Dichloromethane | 75-09-2 | E | >8 hrs | N/D | F | 1 hr | 7.32 | I/D | I/D | I/D | I/D | I/D | I/D | P | 4 min | 766 | I/D | I/D | I/D |
| Diethyl Ether | 60-29-7 | E | >8 hrs | N/D | P | 12 min | 21.5 | P | 8 min | 92.2 | I/D | I/D | I/D | P | 14 min | 21.8 | I/D | I/D | I/D |

D = Degradation
BT = Breakthrough Time
PR = Permeation Rate

E = Excellent
G = Good
F = Fair
P = Poor

N/D = None Detected
I/D = Insufficient Data

Good for total immersion
 Good for accidental splash protection and intermittent contact
 Only use with extreme caution. Glove will fail with only short exposure

| | | Silver Shield | | | Viton | | | Butyl | | | Chemsoft | | | Nitrile | | | Natural Rubber | | |
|-----------------------------|-----------|---------------|---------|--------|-------|---------|-------|-------|---------|-------|----------|----------|-------|---------|---------|------|----------------|--------|------|
| Chemical Name | CAS No. | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR |
| Diethyl Oxide | 60-29-7 | E | >8 hrs | N/D | P | 12 min | 21.5 | P | 8 min | 92.2 | I/D | I/D | I/D | P | 14 min | 21.8 | I/D | I/D | I/D |
| Diethylamine | 109-89-7 | E | >8 hrs | N/D | P | 35 min | 852 | P | 47 min | 46 | I/D | I/D | I/D | F | I/D | I/D | I/D | I/D | I/D |
| Diethylaminoethanol | 100-37-8 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >7.8 hrs | 0.02 | E | >8 hrs | N/D | I/D | I/D | I/D |
| 1,4-Diethylene Dioxide | 123-91-1 | I/D | I/D | I/D | P | 23 min | 26.8 | E | >20 hrs | N/D | I/D | I/D | I/D | P | 28 min | 77.1 | I/D | I/D | I/D |
| Diethylene Ether | 123-91-1 | I/D | I/D | I/D | P | 23 min | 26.8 | E | >20 hrs | N/D | I/D | I/D | I/D | P | 28 min | 77.1 | I/D | I/D | I/D |
| Diethylene Oxide | 123-91-1 | I/D | I/D | I/D | P | 23 min | 26.8 | E | >20 hrs | N/D | I/D | I/D | I/D | P | 28 min | 77.1 | I/D | I/D | I/D |
| Diethylenetriamine | 111-40-0 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | P | I/D | I/D | I/D | I/D | I/D |
| Diisobutyl Ketone (80%) | 108-83-8 | E | >8 hrs | N/D | F | 1.1 hrs | 90.6 | G | 3.3 hrs | 41.2 | I/D | I/D | I/D | F | 2.9 hrs | 49 | I/D | I/D | I/D |
| Dimethyl Acetamide | 127-19-5 | F | 1.5 hrs | 0.728 | P | 25 min | 3 | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Dimethyl Formamide | 68-12-2 | E | >8 hrs | N/D | P | 8 min | 6.5 | E | >8 hrs | N/D | I/D | I/D | I/D | F | 9 min | 15 | I/D | I/D | I/D |
| Dimethyl Mercury | 593-74-8 | E | >4 hrs | <0.017 | P | <15 min | 3.1 | P | <15 min | 46.7 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Dimethyl Sulfoxide | 67-68-5 | G | I/D | I/D | F | 1.5 hrs | 5 | E | >8 hrs | N/D | F | 41 min | 3.7 | F | 40 min | 5.2 | I/D | I/D | I/D |
| Dimethylketone | 67-64-1 | E | >8 hrs | N/D | P | 2 min | 383 | E | >8 hrs | N/D | P | 1 min | 42.3 | P | 3 min | 291 | P | 10 min | 12.2 |
| Diocetyl Phthalate | 117-81-7 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D |
| 1,4-Dioxane | 123-91-1 | I/D | I/D | I/D | P | 23 min | 26.8 | E | >20 hrs | N/D | I/D | I/D | I/D | P | 28 min | 77.1 | I/D | I/D | I/D |
| Dioxyethylene Ether | 123-91-1 | I/D | I/D | I/D | P | 23 min | 26.8 | E | >20 hrs | N/D | I/D | I/D | I/D | P | 28 min | 77.1 | I/D | I/D | I/D |
| Divinyl Benzene | 1321-74-0 | E | >8 hrs | N/D | E | >17 hrs | N/D | F | 2.2 hrs | 238 | I/D | I/D | I/D | P | I/D | I/D | I/D | I/D | I/D |
| Epichlorohydrin | 106-89-8 | I/D | I/D | I/D | P | 2 hrs | 4 | E | >8 hrs | N/D | I/D | I/D | I/D | P | I/D | I/D | I/D | I/D | I/D |
| 1,2-Epoxypropane | 75-56-9 | I/D | I/D | I/D | P | 1 min | 1790 | F | 2.2 hrs | 7 | I/D | I/D | I/D | P | <6 min | >3.9 | I/D | I/D | I/D |
| Ethanal | 75-7-0 | E | >8 hrs | N/D | P | 0 min | 281.9 | E | >8 hrs | 0.066 | I/D | I/D | I/D | P | 0 min | 161 | I/D | I/D | I/D |
| Ethanol | 64-17-5 | E | >8 hrs | N/D | I/D | I/D | I/D | E | >8 hrs | N/D | F | 1.2 hrs | 3.3 | I/D | I/D | I/D | I/D | I/D | I/D |
| Ether | 60-29-7 | E | >8 hrs | N/D | P | 12 min | 21.5 | P | 8 min | 92.2 | I/D | I/D | I/D | P | 14 min | 21.8 | I/D | I/D | I/D |
| Ethyl Acetate | 141-78-6 | E | >8 hrs | N/D | P | I/D | I/D | G | 7.6 hrs | 3.4 | I/D | I/D | I/D | P | 8 min | 145 | I/D | I/D | I/D |
| Ethyl Alcohol | 64-17-5 | E | >8 hrs | N/D | I/D | I/D | I/D | E | >8 hrs | N/D | F | 1.2 hrs | 3.3 | I/D | I/D | I/D | G | 31 min | 2.4 |
| Ethyl Aldehyde | 75-07-0 | E | >8 hrs | N/D | P | 0 min | 281.9 | E | >8 hrs | 0.066 | I/D | I/D | I/D | P | 0 min | 161 | I/D | I/D | I/D |
| Ethyl Ether | 60-29-7 | E | >8 hrs | N/D | P | 12 min | 21.5 | P | 8 min | 92.2 | I/D | I/D | I/D | P | 14 min | 21.8 | I/D | I/D | I/D |
| Ethylamine (70% in water) | 75-04-7 | F | 51 min | 0.65 | P | I/D | I/D | E | >12 hrs | N/D | I/D | I/D | I/D | F | 1.1 hrs | 30.1 | I/D | I/D | I/D |
| Ethylene Dichloride | 107-06-2 | E | >8 hrs | N/D | E | >8 hrs | N/D | F | 2.9 hrs | 53 | I/D | I/D | I/D | P | 8 min | 82.7 | I/D | I/D | I/D |
| Ethylene Glycol | 107-21-1 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | E | >8 hrs | N/D | I/D | I/D | I/D | E | >8hrs | N/D |
| Ethylene Oxide | 75-21-8 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Formaldehyde (37% in water) | 50-00-0 | E | >8 hrs | N/D | E | >16 hrs | N/D | E | >16 hrs | N/D | E | >8hrs | 0.007 | E | >21 hrs | N/D | I/D | I/D | I/D |
| Furfural | 98-01-1 | E | >8 hrs | N/D | F | 3.5 hrs | 14.8 | E | >16 hrs | N/D | I/D | I/D | I/D | P | 24 min | 265 | I/D | I/D | I/D |
| Glutaraldehyde (25%) | 111-30-8 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | P | I/D | I/D | E | >6 hrs | N/D |
| Heptane | 142-82-5 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | E | >6 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Hexahydrobenzene | 110-82-7 | E | >4hrs | N/D | E | >7 hrs | N/D | F | 50 min | 103.8 | E | >8 hrs | N/D | F | I/D | I/D | I/D | I/D | I/D |

| | | Silver Shield | | | Viton | | | Butyl | | | Chemsoft | | | Nitrile | | | Natural Rubber | | |
|------------------------------|-----------|---------------|--------|-------|-------|---------|------|-------|----------|-------|----------|--------|--------|---------|----------|-------|----------------|----------|------|
| Chemical Name | CAS No. | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR |
| Hexahydrophenol | 108-93-0 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >11 hrs | N/D | E | >6 hrs | N/D | E | >16 hrs | N/D | I/D | I/D | I/D |
| Hexamethylene | 110-82-7 | E | >4hrs | N/D | E | >7 hrs | N/D | F | 50 min | 103.8 | E | >8 hrs | N/D | F | I/D | I/D | I/D | I/D | I/D |
| Hexanaphthene | 110-82-7 | E | >4hrs | N/D | E | >7 hrs | N/D | F | 50 min | 103.8 | E | >8 hrs | N/D | F | I/D | I/D | I/D | I/D | I/D |
| Hexane | 110-54-3 | E | >8 hrs | N/D | E | >8 hrs | N/D | P | I/D | I/D | E | >6 hrs | N/D | E | I/D | I/D | I/D | I/D | I/D |
| Hydrochloric Acid (37%) | 7647-01-0 | E | >8 hrs | N/D | E | I/D | I/D | E | I/D | I/D | E | >6 hrs | N/D | E | >6 hrs | N/D | E | >6 hrs | N/D |
| Hydrofluoric Acid (48%) | 7664-39-3 | E | >8 hrs | 0.013 | G | I/D | I/D | F | I/D | I/D | I/D | I/D | I/D | G | 1 hr | 0.49 | E | 7 hrs | 0.18 |
| Hydrogen Chloride (gas) | 7647-01-0 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Iodomethane | 74-88-4 | P | 4 min | 0.026 | E | 6.3 hrs | 0.7 | F | 55 min | 82 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Isobutyl Alcohol | 78-83-1 | E | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D |
| Isopropyl Alcohol | 67-63-0 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | E | >6 hrs | N/D | E | >6 hrs | N/D | G | 1.7 hrs | 0.42 |
| Ketohexamethylene | 108-94-1 | E | >8 hrs | N/D | P | 29 min | 86.3 | E | >16 hrs | N/D | I/D | I/D | I/D | P | I/D | I/D | F | 2.1 hrs | 0.07 |
| Methacrylic Acid | 79-41-4 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | F | 1.7 hrs | 23 | I/D | I/D | I/D |
| Methacrylonitrile | 126-98-7 | E | I/D | I/D | F | 4 min | 462 | E | >8 hrs | N/D | I/D | I/D | I/D | P | 7 min | 560 | I/D | I/D | I/D |
| Methanol | 67-56-1 | E | 6 hrs | 0.02 | F | 3 hrs | 1 | E | >8 hrs | N/D | I/D | I/D | I/D | F | 32 min | 11.8 | F | 19 min | 1.97 |
| Methenyl Trichloride | 67-66-3 | E | >8 hrs | N/D | E | 9.5 hrs | 0.46 | I/D | I/D | I/D | I/D | I/D | I/D | P | 4 min | 352 | I/D | I/D | I/D |
| Methyl Alcohol | 67-56-1 | E | 6 hrs | 0.02 | F | 3 hrs | 1 | E | >8 hrs | N/D | I/D | I/D | I/D | F | 32 min | 11.8 | F | 19 min | 1.97 |
| 1-Methyl-4-tert-butylbenzene | 98-51-1 | E | >8 hrs | N/D | E | >8 hrs | N/D | F | 1.78 hrs | 8 | I/D | I/D | I/D | P | I/D | I/D | I/D | I/D | I/D |
| Methyl Cellosolve | 109-86-4 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | F | 55 min | 13.2 | F | 45 min | 0.56 |
| Methyl Chloride | 74-87-3 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | 0.0013 | I/D | I/D | I/D | I/D | I/D | I/D |
| Methyl Chloroform | 71-55-6 | E | >8 hrs | N/D | E | >15 hrs | N/D | P | I/D | I/D | I/D | I/D | I/D | P | 37 min | 76.4 | I/D | I/D | I/D |
| Methyl Iodide | 74-88-4 | P | 4 min | 0.026 | E | 6.3 hrs | 0.7 | F | 55 min | 82 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Methylamine (40% in water) | 74-89-5 | F | 46 min | 1.28 | E | >16 hrs | N/D | E | >15 hrs | N/D | F | 1.7 hr | 7 | E | >8 hrs | N/D | I/D | I/D | I/D |
| Methylbenzene | 108-88-3 | E | >8 hrs | N/D | E | >16 hrs | N/D | P | 6 min | 511 | I/D | I/D | I/D | P | 11 min | 68.1 | P | 3 min | 82.2 |
| Methylene Chloride | 75-09-2 | E | >8 hrs | N/D | F | 1 hr | 7.32 | P | I/D | I/D | P | I/D | I/D | P | 4 min | 766 | I/D | I/D | I/D |
| 4,4-Methylene Dianiline | 101-77-9 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | F | I/D | I/D | I/D | I/D | I/D |
| Monoethanolamine | 141-43-5 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Morpholine | 110-91-8 | E | >8 hrs | N/D | G | 1.9 hrs | 97 | E | >16 hrs | N/D | I/D | I/D | I/D | P | 48 min | 206 | I/D | I/D | I/D |
| Naphtha | 8052-41-3 | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | E | >8 hrs | N/D | E | >6 hrs | N/D | I/D | I/D | I/D |
| n-Hexane | 110-54-3 | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | E | >6 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Nitrobenzene | 98-95-3 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | F | 29 min | 1.7 | P | 7 min | 8.4 |
| Nitromethane | 75-52-5 | I/D | I/D | I/D | I/D | I/D | I/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | P | 7 min | 2.83 |
| 1-Nitropropane | 108-03-2 | E | >8 hrs | N/D | P | 17 min | 26.1 | E | >8 hrs | N/D | I/D | I/D | I/D | P | 12 min | 29.5 | I/D | I/D | I/D |
| n-Methyl-2-Pyrrolidone | 872-50-4 | I/D | I/D | I/D | I/D | I/D | I/D | E | 8 hrs | N/D | I/D | I/D | I/D | F | 1.45 hrs | 0.388 | F | 1.26 hrs | 3.14 |
| n-Propyl Acetate | 109-60-4 | E | >8 hrs | N/D | I/D | I/D | I/D | F | 2.7 hrs | 2.86 | I/D | I/D | I/D | P | 17 min | 72.5 | I/D | I/D | I/D |
| Oxalic Acid | 144-62-7 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | G | I/D | I/D | I/D | I/D | I/D |

D = Degradation
BT = Breakthrough Time
PR = Permeation Rate

E = Excellent
G = Good
F = Fair
P = Poor

N/D = None Detected
I/D = Insufficient Data



 Good for total immersion
 Good for accidental splash protection and intermittent contact
 Only use with extreme caution. Glove will fail with only short exposure

| | | Silver Shield | | | Viton | | | Butyl | | | Chemsoft | | | Nitrile | | | Natural Rubber | | |
|-----------------------|-----------|---------------|--------|-----|-------|---------|------|-------|----------|------|----------|---------|------|---------|---------|-------|----------------|---------|------|
| Chemical Name | CAS No. | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR | D | BT | PR |
| p-Dioxane | 123-91-1 | I/D | I/D | I/D | P | 23 min | 26.8 | E | >20 hrs | N/D | I/D | I/D | I/D | P | 28 min | 77.1 | I/D | I/D | I/D |
| Perchloric Acid (70%) | 7601-90-3 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D |
| Perchloroethylene | 127-18-4 | E | >8 hrs | N/D | E | >17 hrs | N/D | P | I/D | I/D | F | 1 hr | 3.8 | F | 1.3 hrs | 5.5 | I/D | I/D | I/D |
| Perchloromethane | 56-23-5 | E | >8 hrs | N/D | E | >13 hrs | N/D | I/D | I/D | I/D | F | 1.3 hrs | 3.45 | F | 3.4 hrs | 5 | I/D | I/D | I/D |
| Phenol (85% in water) | 108-95-2 | E | >8 hrs | N/D | E | >15 hrs | N/D | E | >20 hrs | N/D | I/D | I/D | I/D | P | 39 min | >1500 | F | 2.2 hrs | 4.64 |
| Phenylamine | 62-53-3 | E | >8 hrs | N/D | P | 6 min | 18.7 | E | >8 hrs | N/D | I/D | I/D | I/D | F | 1.1 hrs | 45 | I/D | I/D | I/D |
| Phosphoric Acid (85%) | 7664-38-2 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D |
| Pimelic Ketone | 108-94-1 | E | >8 hrs | N/D | P | 29 min | 86.3 | E | >16 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | F | 2.1 hrs | 0.07 |
| 2-Propanone | 67-64-1 | E | >8 hrs | N/D | P | 2 min | 383 | E | >8 hrs | N/D | P | 1 min | 42.3 | P | 3 min | 291 | P | 10 min | 12.2 |
| Propyl Acetate | 109-60-4 | E | >8 hrs | N/D | P | I/D | I/D | G | 2.7 hrs | 2.86 | I/D | I/D | I/D | P | 17 min | 72.5 | I/D | I/D | I/D |
| Propyl Alcohol | 71-23-8 | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | G | 3.8 hrs | 0.35 | E | 4.4 hrs | 1.1 | I/D | I/D | I/D |
| Propylene Oxide | 75-56-9 | I/D | I/D | I/D | P | 1 min | 1790 | F | 2.2 hrs | 7 | I/D | I/D | I/D | P | <6 min | >3.9 | I/D | I/D | I/D |
| p-tert-Butyltoluene | 98-51-1 | E | >8 hrs | N/D | E | >8 hrs | N/D | F | 1.78 hrs | 8 | I/D | I/D | I/D | P | I/D | I/D | I/D | I/D | I/D |
| Pyridine | 110-86-1 | I/D | I/D | I/D | P | 38 min | 74 | E | >8 hrs | N/D | I/D | I/D | I/D | P | I/D | I/D | I/D | I/D | I/D |
| Sodium Hydroxide 50% | 1310-73-2 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D |
| Stoddard Solvent | 8052-41-3 | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | E | >8 hrs | N/D | E | >6 hrs | N/D | I/D | I/D | I/D |
| Styrene | 100-42-5 | E | >6 hrs | N/D | E | >6 hrs | N/D | F | 35 Mins | 0.19 | P | 16 min | 39 | P | 11 min | >3.35 | I/D | I/D | I/D |
| Sulfuric Acid (50%) | 7664-93-9 | E | >6 hrs | N/D | E | I/D | I/D | E | I/D | I/D | G | >8 hrs | N/D | G | >6 hrs | N/D | G | >6 hrs | N/D |
| Sulfuric Acid (93%) | 7664-93-9 | E | >8 hrs | N/D | E | >8 hrs | N/D | E | >8 hrs | N/D | P | 2 min | N/D | F | 1.9 hrs | 11.4 | G | 5.1 hrs | N/D |
| Tetrachloroethylene | 127-18-4 | E | >8 hrs | N/D | E | >17 hrs | N/D | P | I/D | I/D | F | 1 hr | 3.8 | F | 1.3 hrs | 5.5 | I/D | I/D | I/D |
| Tetrachloromethane | 56-23-5 | E | >8 hrs | N/D | E | >13 hrs | N/D | I/D | I/D | I/D | F | 1.3 hrs | 3.45 | F | 3.4 hrs | 5 | I/D | I/D | I/D |
| Tetrahydrofuran | 109-99-9 | E | >8 hrs | N/D | P | 0 min | 327 | F | 27 min | 112 | P | I/D | I/D | P | 0 min | 167 | P | 5 min | 360 |
| Thioglycolic Acid | 68-11-1 | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Toluene | 108-88-3 | E | >8 hrs | N/D | E | >16 hrs | N/D | P | 6 min | 511 | P | I/D | I/D | P | 11 min | 68.1 | P | 3 min | 82.2 |
| Toluene Diisocyanate | 584-84-9 | E | >8 hrs | N/D | I/D | I/D | I/D | E | I/D | I/D | F | 1 hr | 2.52 | G | I/D | I/D | I/D | I/D | I/D |
| 1,1,1-Trichloroethane | 71-55-6 | E | >8 hrs | N/D | E | >15 hrs | N/D | P | I/D | I/D | I/D | I/D | I/D | F | 37 min | 76.4 | I/D | I/D | I/D |
| Trichloroethylene | 79-01-6 | E | >8 hrs | N/D | E | 7.4 hrs | 0.24 | P | 14 min | 550 | I/D | I/D | I/D | P | 4 min | 283 | P | <5 min | 894 |
| Trichloromethane | 67-66-3 | E | >8 hrs | N/D | E | 9.5 hrs | 0.46 | I/D | I/D | I/D | I/D | I/D | I/D | P | 4 min | 352 | I/D | I/D | I/D |
| Triethanolamine | 102-71-6 | I/D | I/D | I/D | I/D | I/D | I/D | E | >8 hrs | N/D | E | >8 hrs | N/D | I/D | I/D | I/D | E | >8 hrs | N/D |
| Triethylamine | 121-44-8 | I/D | I/D | I/D | E | >8 hrs | N/D | P | I/D | I/D | E | 5.8 hrs | 0.18 | E | >8 hrs | N/D | I/D | I/D | I/D |
| Vinegar Naphtha | 141-78-6 | E | >8 hrs | N/D | P | I/D | I/D | E | 7.6 hrs | 3.4 | I/D | I/D | I/D | P | 8 min | 145 | I/D | I/D | I/D |
| Vinylstyrene | 1321-74-0 | E | >8 hrs | N/D | E | >17 hrs | N/D | F | 2.2 hrs | 238 | I/D | I/D | I/D | P | I/D | I/D | I/D | I/D | I/D |
| Xylene | 1330-20-7 | E | >8 hrs | N/D | E | >8 hrs | N/D | P | I/D | I/D | P | I/D | I/D | P | 21 min | 18.5 | I/D | I/D | I/D |

D = Degradation
BT = Breakthrough Time
PR = Permeation Rate

E = Excellent
G = Good
F = Fair
P = Poor

N/D = None Detected
I/D = Insufficient Data

 Good for total immersion
 Good for accidental splash protection and intermittent contact
 Only use with extreme caution. Glove will fail with only short exposure

Viton® - Unsupported Gloves

Excellent chemical resistance to chlorinated and aromatic solvents. Can be used in water based solvents without dissolving. Superior resistance to PCBs. Curved finger and hand design provides better fit for greater worker comfort.

Viton® is a registered trademark of the DuPont company.



| Part No. | Description | Sizes | Grip/Cuff | Length/Gauge | Inner Pack | Case Pack |
|----------|---------------------------|-------|-----------------|--------------|------------|-----------|
| F101 | Black, sanitized interior | 8-11 | Smooth/straight | 11"/10 mil | 1 pair | 10 pair |
| F124 | Black, sanitized interior | 8-11 | Smooth/straight | 14"/12 mil | 1 pair | 10 pair |

Silver Shield®/4H® Gloves

Resistant to over 280 different chemicals: alcohols, aliphatic, aromatics, chlorines, ketones, esters. Low cost, disposable gloves do not have to be recycled and can be readily available to workers. Does not contain chemical accelerators that can cause allergic reactions. Can be used as a secondary inner glove. Allows worker maximum protection in heavy-duty jobs where the dangers of mechanical damage to gloves are high.



| Part No. | Description | Sizes | Grip/Cuff | Length/Gauge | Inner Pack | Case Pack |
|----------|-----------------|-----------|-----------------|---------------|------------|-----------|
| SSG | Silver, unlined | 6, 7, 8 | Smooth/straight | 14.5"/2.7 mil | 10 pair | 50 pair |
| | | 9, 10, 11 | Smooth/straight | 16"/2.7 mil | 10 pair | 50 pair |
| SSG29/10 | Silver, unlined | 10 | Smooth/straight | 29"/2.7 mil | 10 pair | 50 pair |

NitriGuard Unsupported Nitrile Gloves

100% nitrile content offers superior resistance to cuts, snags, abrasions and punctures. Gloves are free of latex proteins which can cause allergic reactions. Comply with USDA and FDA regulations, 21 CFR, for use in food processing. Available with unlined or flocked interior.



| Part No. | Description | Sizes | Grip/Cuff | Length/Gauge | Inner Pack | Case Pack |
|-----------|---------------------------|-------|--------------------|--------------|------------|------------|
| LA102G | Green, sanitized interior | 7-11 | Sandpatch/straight | 13"/11 mil | 1 dz pair | 12 dz pair |
| LA142G | Green, sanitized interior | 7-11 | Sandpatch/straight | 13"/15 mil | 1 dz pair | 12 dz pair |
| LA225G | Green, sanitized interior | 7-11 | Sandpatch/straight | 15"/22 mil | 1 dz pair | 6 dz pair |
| LA258G | Green, sanitized interior | 7-11 | Sandpatch/straight | 18"/25 mil | 1 dz pair | 6 dz pair |
| LA111EB | Blue, sanitized interior | 7-11 | Sandpatch/straight | 13"/11 mil | 1 dz pair | 12 dz pair |
| LA132G | Green, flock interior | 7-11 | Sandpatch/straight | 13"/15 mil | 1 dz pair | 12 dz pair |
| LA172G | Green, flock interior | 7-11 | Sandpatch/straight | 13"/17 mil | 1 dz pair | 12 dz pair |
| LA111EBFL | Blue, flock interior | 7-11 | Sandpatch/straight | 13"/15 mil | 1 dz pair | 12 dz pair |

Butyl - Unsupported Gloves

Highest permeation resistance to gas and water vapor for greater worker protection, especially when handling toxic substances. Flexible and sensitive, even at lower temperatures. Curved finger and hand design provides a better fit for greater worker comfort. Available with "Grip-Saf" palm for wet applications.



| Part No. | Description | Sizes | Grip/Cuff | Length/Gauge | Inner Pack | Case Pack |
|----------|--|--------|----------------------------|--------------|------------|-----------|
| B131 | Black, sanitized interior | 7-11 | Smooth/rolled bead | 11"/13 mil | 1 pair | 288 pair |
| B131R | Black, sanitized interior | 7-11 | Rough Grip-Saf/rolled bead | 11"/13 mil | 1 pair | 288 pair |
| B161 | Black, sanitized interior | 7-11 | Smooth/rolled bead | 11"/16 mil | 1 pair | 144 pair |
| B161R | Black, sanitized interior | 7-11 | Rough Grip-Saf/rolled bead | 11"/16 mil | 1 pair | 72 pair |
| B174 | Black, sanitized interior | 7-11 | Smooth/rolled bead | 14"/17 mil | 1 pair | 288 pair |
| B174R | Black, sanitized interior | 7-11 | Rough Grip-Saf/rolled bead | 14"/17 mil | 1 pair | 288 pair |
| B324 | Black, sanitized interior | 7-11 | Smooth/rolled bead | 14"/32 mil | 1 pair | 144 pair |
| B324R | Black, sanitized interior | 7-11 | Rough Grip-Saf/rolled bead | 14"/32 mil | 1 pair | 72 pair |
| B074GI | Black, sanitized interior | XS- XL | Smooth/rolled bead | 14"/7 mil | 1 pair | 100 pair |
| B074RGI | Black, sanitized interior | XS- XL | Rough/rolled bead | 14"/7 mil | 1 pair | 100 pair |
| B144GI | Black, sanitized interior | XS- XL | Smooth/rolled bead | 14"/14 mil | 1 pair | 100 pair |
| B144RGI | Black, sanitized interior | XS- XL | Rough/rolled bead | 14"/14 mil | 1 pair | 100 pair |
| B174GI | Black, sanitized interior | XS- XL | Smooth/rolled bead | 14"/17 mil | 1 pair | 100 pair |
| B174RGI | Black, sanitized interior | XS- XL | Rough/rolled bead | 14"/17 mil | 1 pair | 100 pair |
| B254GI | Black, sanitized interior | XS- XL | Smooth/rolled bead | 14"/25 mil | 1 pair | 100 pair |
| B254RGI | Black, sanitized interior | XS- XL | Rough/rolled bead | 14"/25 mil | 1 pair | 100 pair |
| B224G | Black, sanitized interior cotton liner | XS- XL | Smooth/rolled bead | 14"/25 mil | 1 pair | 100 pair |

Chemsoft® Industrial Glove

Unique patented 100% nitrile formulation is 59% stretchier¹ than the leading industrial weight nitrile gloves. Gives wearer dexterity required to pick up small parts, better than comparable nitrile gloves on the market, without hand fatigue. Comply with USDA and FDA regulations, 21 CFR, for use in food processing. Free of latex proteins which can cause allergic reactions.

¹ Based on an independent scientific comparison between the new North Chemsoft Industrial glove and Ansell-Edmont Sol-Vex brand conducted by the Akron Rubber Development Laboratory.



| Part No. | Description | Sizes | Grip/Cuff | Length/Gauge | Inner Pack | Case Pack |
|----------|--------------------------|-------|--------------------|--------------|------------|------------|
| CS113B | Blue, sanitized interior | 7-11 | Sandpatch/straight | 13"/11 mil | 1 dz pair | 12 dz pair |
| CS153B | Black, flock interior | 7-11 | Sandpatch/straight | 13"/15 mil | 1 dz pair | 12 dz pair |

Unsupported Premium Natural Rubber*

100% high natural rubber has excellent dexterity, elasticity, and tensile strength for long wear and comfort. Embossed palm and fingers have a better wet grip. Rolled edge prevents cuff from tearing. Chlorinated for more comfort and ease when using. Complies with USDA and FDA regulations, 21 CFR, for use in food processing.

*CAUTION: This product contains natural rubber latex proteins which may cause allergic reactions.



| Part No. | Description | Sizes | Grip/Cuff | Length/Gauge | Inner Pack | Case Pack |
|----------|----------------------------|-------|-----------------------|--------------|------------|------------|
| PNLB1815 | Orange, sanitized interior | 7-11 | Diamond embossed/bead | 15"/18 mil | 1 dz pair | 12 dz pair |

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