



Personal Protective Equipment (P.P.E) for Chemical Handling – Hand Protection

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Definition of P.P.E

Means any equipment which is intended to be worn or held by a person at work and which protects him against one or more risks to his health or safety and any additional accessory designed to meet that objective.



Personal Protective Equipment (P.P.E) As Last Resort

- Personal Protective Equipment (PPE) must be provided when necessary by reason of hazards encountered that are capable of causing injury or impairment
- Use of PPE does not eliminate the hazard, so if the equipment fails then exposure occurs



Definition of Hazards:

Any condition or act with the potential to cause harm – injury, ill health, damage to property or environment & etc.



Potential Route of Entry

- Inhalation
- Skin Contact
- Ingestion
- Eyes
- Hearing



The PPE selection basis should be based on the type of hazard the worker is exposed

– MECHANICAL

- Puncture, Cut, Abrasive object (mechanical), Moving machinery

– CHEMICAL

- Corrosive, Irritant, Carcinogen, Poison

– PHYSICAL

- Noise, Radiation, Extreme temperature, Vibration, Electrical

– BIOLOGICAL

- Bacterial, Parasitic, Virus



Types of Personal Protective Equipment (P.P.E)

- Head Protection
- Eye & Face Protection
- **Hand & Arm Protection**
- Respiratory Protection
- Hearing Protection
- Foot Protection
- Body Protection





Hand Protection



Hand Hazards



Can largely be group into 5 types:



Chemical



Thermal



Biological



Mechanical



Electrical



Types of Gloves

- **Chemical Resistance**
- General Purpose
- Special Application



Consideration when selecting gloves:

- Application of glove
- Material
- Length
- Size
- Cuff Types
- Dexterity & Comfort
- Meet approved Standards



Chemical Hazards



Dermatitis



Alkaline



Solvent

Chemical Resistant Gloves



Natural Rubber



Neoprene



Nitrile



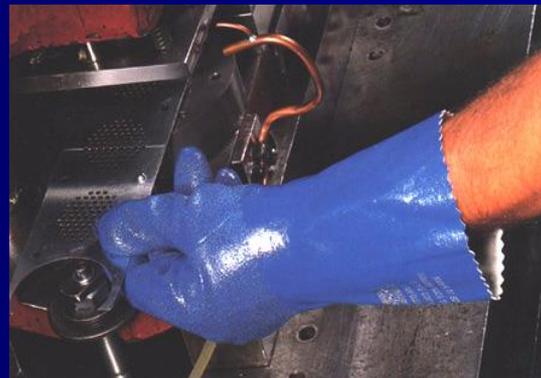
PVA



Butyl



PVC



VITON



Chemical Gloves Selection Chart



Permeation/Degradation Resistance Guide for Ansell Gloves

The first square in each column for each glove type is color coded. This is an easy-to-read indication of how we rate this type of glove in relation to its applicability for each chemical listed. The color represents an overall rating for both degradation and permeation. The letter in each square is for Degradation alone...

- GREEN: The glove is very well suited for application with that chemical.
- YELLOW: The glove is suitable for that application under careful control of its use.
- RED: Avoid use of the glove with this chemical.



CHEMICAL	LAMINATE FILM			NITRILE			UNSUPPORTED NEOPRENE			SUPPORTED POLYVINYL ALCOHOL			POLYVINYL CHLORIDE (Vinyt)			NATURAL RUBBER			NEOPRENE/NATURAL RUBBER BLEND		
	BARRIER			SOL-VEX			29-865			PVA			SNORKEL			CANNERS AND HANDLERS*			CHEMI-PRO*		
	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate
1. Acetaldehyde	■	380	E	P	-	-	E	10	F	NR	-	-	NR	-	-	E	7	F	E	10	F
2. Acetic Acid	■	150	-	G	270	-	E	60	-	NR	-	-	F	180	-	E	110	-	E	260	-
3. Acetone	▲	>480	E	NR	-	-	E	10	F	P	-	-	NR	-	-	E	10	F	G	10	G
4. Acetonitrile	▲	>480	E	F	30	F	E	20	G	■	150	G	NR	-	-	E	4	VG	E	10	VG
5. Acrylic Acid	-	-	-	G	120	-	E	390	-	NR	-	-	NR	-	-	E	80	-	E	65	-
6. Acrylonitrile	E	>480	E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Allyl Alcohol	▲	>480	E	F	140	F	E	140	VG	P	-	-	P	60	G	E	>10	VG	E	20	VG
8. Ammonia Gas	■	19	E	▲	>480	-	▲	>480	-	-	-	-	■	6	VG	-	-	-	■	27	VG
9. Ammonium Fluoride, 40%	-	-	-	E	>360	-	E	>480	-	NR	-	-	E	>360	-	E	>360	-	E	>360	-
10. Ammonium Hydroxide	E	30	-	E	>360	-	E	250	-	NR	-	-	E	240	-	E	90	-	E	240	-
11. Amyl Acetate	▲	>480	E	E	60	G	NR	-	-	G	>360	E	P	-	-	NR	-	-	P	-	-
12. Amyl Alcohol	-	-	-	E	30	E	E	290	VG	G	180	G	G	12	E	E	25	VG	E	45	VG
13. Aniline	▲	>480	E	NR	-	-	E	100	P	F	>360	E	F	180	VG	E	25	VG	E	50	G
14. Aqua Regia	-	-	-	F	>360	-	G	>480	-	NR	-	-	G	120	-	NR	-	-	G	180	-
15. Benzaldehyde	▲	>480	E	NR	-	-	NR	-	-	G	>360	E	NR	-	-	G	10	VG	G	25	F
16. Benzene, Benzol	▲	>480	E	P	-	-	NR	-	-	E	>360	E	NR	-	-	NR	-	-	NR	-	-
17. Benzotrichloride	-	-	-	E	>480	E	NR	-	-	-	-	-	-	-	-	NR	-	-	NR	-	-

How to Read the Charts

Three categories of data are represented for each Ansell product and corresponding chemical: 1) overall degradation resistance rating; 2) permeation breakthrough time, and 3) permeation rate.

Standards for Color-Coding

A glove-chemical combination receives **GREEN**  if either set of the following conditions is met:

- The degradation rating is Excellent or Good
- The permeation breakthrough time is 30 minutes or longer
- The permeation rate is Excellent, Very Good, or Good.

OR

- The permeation rate is not specified
- The permeation breakthrough time is 240 minutes or longer
- The degradation rating is Excellent, Very Good, or Good

A glove-chemical combination receives **RED**  if: the degradation rating is Poor or Not Recommended, regardless of the permeation rating.

All other glove-chemical combinations receive **YELLOW** . In other words, any glove-chemical combination not meeting either set of conditions required for Green, and not having a Red degradation rating of either Poor or Not Recommended, receives a **YELLOW**  rating.

Key to Permeation Rate	
	Simply Stated, Drops/hr Through a Glove (eyedropper-size drops)
E - Excellent; permeation rate of less than 0.9 µg/cm ² /min.	0 to 1/2 drop
VG - Very Good; permeation rate of less than 9 µg/cm ² /min.	1 to 5 drops
G - Good; permeation rate of less than 90 µg/cm ² /min.	6 to 50 drops
F - Fair; permeation rate of less than 900 µg/cm ² /min.	51 to 500 drops
P - Poor; permeation rate of less than 9000 µg/cm ² /min.	501 to 5000 drops
NR - Not Recommended; permeation rate greater than 9000 µg/cm ² /min.	5001 drops up
Note: The current revision to the ASTM standard permeation test calls for permeation to be reported in micrograms of chemical permeated per square centimeter of material exposed per minute of exposure, "µg/cm ² /min."	

Key to Permeation Breakthrough	
> Greater than (time)	< Less than (time)

Key to Degradation Ratings	
E - Excellent; fluid has very little degrading effect.	NOTE: Any test samples rated P (poor) or NR (not recommended) in degradation testing were not tested for permeation resistance. A dash (-) appears in those cases.
G - Good; fluid has minor degrading effect.	
F - Fair; fluid has moderate degrading effect.	
P - Poor; fluid has pronounced degrading effect.	
NR - Fluid was not tested against this material.	

Specific Gloves Used for Testing		
	Degradation	Permeation
Nitrile	Sol-Vex® 37-145 (11 mil/0.28 mm)	Sol-Vex® 37-165 (22 mil/0.54 mm)
Neoprene Unsupported	29-865 (18 mil/0.46 mm)	29-865 (18 mil/0.46 mm)
Polyvinyl Alcohol Supported	PVA™	PVA™
Polyvinyl Chloride Supported	Snorkel®	Monkey Grip™
Natural Rubber Latex	Canners 392 (19 mil/0.48 mm)	Canners 392 (19 mil/0.48 mm)
Neoprene/Latex Blend	Chemi-Pro 224 (27 mil/0.67 mm)	Chemi-Pro 224 (27 mil/0.67 mm)
Laminated LCP™ Film	Barrier 2-100 (2.5 mil/0.06 mm)	Barrier 2-100 (2.5 mil/0.06 mm)
Single palm thickness is listed in both mil and metric millimeter (mm) for Unsupported Gloves. Supported Gloves are specified by glove weight, not thickness.		



Link to Chemical Resistance Gloves Selection:

https://www.ansellpro.com/download/Ansell_7thEditionChemicalResistanceGuide.pdf

<file:///C:/Users/User/Downloads/2640.pdf>

Care & Maintenance of Gloves



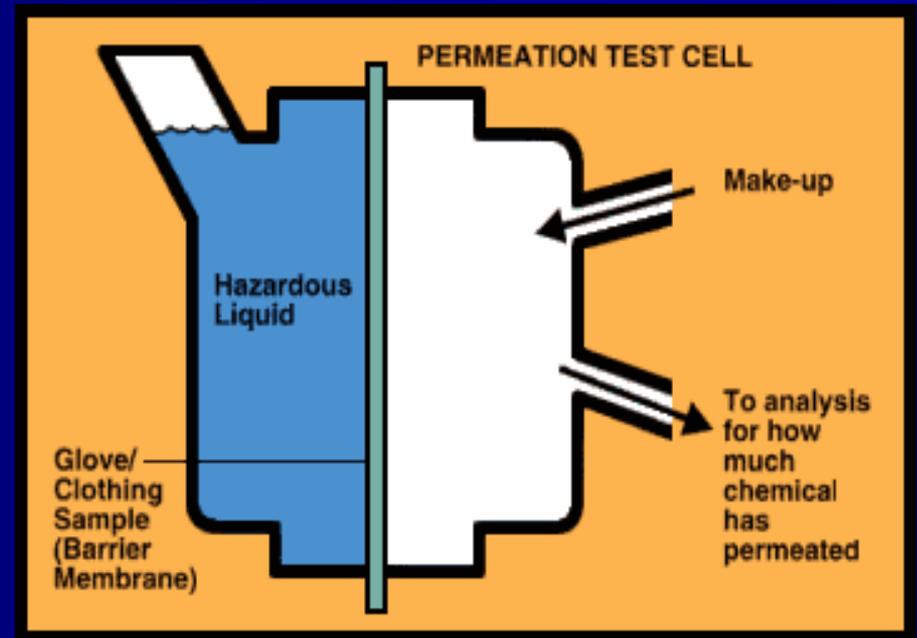
- Wash gloves daily after contact with Chemicals
- Store at ambient temperature away from light, moisture, solvent and chemicals.
- Issue glove on a personal basis
- Inspect for cuts, abrasions, cracks, contamination etc.





When to change a Gloves?

- Torn
- Degraded
- Dirty
- Permeation





Any Question





Thank You

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